LITTELL'S LIVING AGE.—No. 705.—28 NOVEMBER, 1857.

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CHEMICAL FINAL CAUSES,

As illustrated by the presence of Phosphorus, Nitrogen, and Iron in the higher sentient organisms.

THE recent unexampled progress of Anatomy, Chemistry, and Physiology, has brought into startling prominence a problem which may be thus stated, "Why do certain Chemical elements or ingredients, rather than others, enter into the composition of Plants and Animals?" This question has probably been put to himself more or less clearly, by every considerate student of the Sciences named above, and has unconsciously guided researches which did not professedly deal with it. There is not one, moreover, of our great Physiologists and Chemists who has not long meditated on this problem, and largely contributed to its solution, but their replies in the majority of cases, have been indirect and implicit; sometimes indeed instinctive rather than intentional; and those whom they have addressed have often failed to perceive that a question had been proposed, and an answer to it given. A very few have distinctly considered the problem, among whom a foremost place must be assigned to the learned Lehmann* in whose writings such phrases as "the physiological value" of an element continually occur, and who is induced only by a sense of the complexity of the inquiry, and the hoplessness in the present state of our knowledge of disposing of its difficulties, to adjourn its discussion for a season.† As for the great majority, again, of educated, intelligent, medical men and others conversant with Chemistry and Physiology, if such queries are addressed to them as, "Why do our skeletons consist of bone, rather than of wood, or flint, or marble? Why are our teeth composed of ivory rather than of steel? Why is our blood charged with iron, rather than with gold?" they are simply startled and make no reply. And truly no reply but a most imperfect one, is or ever will be possible; nor is it otherwise than with the utmost diffidence, that I attempt to suggest why only certain of the elements occur in living organisms. The question however is certainly one worth attempting to answer, because its consideration cannot but lead us to ennobling meditations of God, one of whose glories it is "to conceal a thing;" whilst to the extent that we can answer it we shall enlarge the domain alike of the Science of Biology and of the Art of Medicine. For no one will doubt that Science would gain by the disposal of the problem before us; and it is scarcely less evident that if we knew one reason, still more each of the reasons, why even one element, not to say all the organismal elements are present in our bodies, we should be better able by the amount of that knowledge to preserve health and cure disease.

The problem thus awaiting a fruitful solution is as follows. Our globe, including the atmosphere, and the ocean with its tributary waters, consists in very unequal proportion of some sixty substances, which according to our present knowledge are simple or elementary. Of these sixty chemical elements, less than a third are found distributed throughout the entire Vegetable and Animal Kingdoms. Of this fractional third, one half occur only in small quantity, so that the *greater* part of the bulk and weight of plants and animals is made up of one fifth or one sixth of the whole elements; and the *greatest* part consists of but three, Carbon, Hydrogen, and Oxygen. This will appear from accompanying table, in which the chemical elements occurring in plants and animals are distinguished from those known to be absent from their tissues, or not yet recognized as present. The ever-present elements of Plants and Animals, I have distinguished as *Organismal* rather than as *Organic;* because on the one hand, the whole of the elements fonnd in living structures, are also found in Inorganic masses; and on the other hand, many organic substances (according to the Chemist's definition of such), as Kakodyle, Stibio-methyle, and Zinc-ethyle, contain respectively Arsenic, Antimony, and Zinc, which are not normal con

* Physiological Chemistry by Prof. G. C. Lehmann, vol. i. Translated for the Cavendish Society by Prof. G. E. Day, St. Andrews. *Methodological Introduction*, pp. 10, 25.

† Op. Cit. pp. 440, 443.

stituents of plants or animals, and unless in the smallest quantities are deadly to all of them.

Organismal Elements.	Non-Organismal Elements.
Non-Metals.	
1. Oxygen.	1. Selenium?
2. Hydrogen.	2. Boron?
3. Nitrogen.	
4. Carbon.	
5. Sulphur.	
6. Phosphorus.	
7. Silicon.	
8. Chlorine.	
9. Bromine.	
10. Iodine.	
11. Fluorine.	
Metals.	
12. Potassium.	3. Aluminium.
13. Sodium.	4. Antimony.
14. Calcium.	5. Arsenic?
15. Magnesium.	6. Barium.
16. Iron.	7. Bismuth.
17. Manganese.	8. Cadmium.
	9. Cerium.
	10. Chromium.
	11. Cobalt.
	12. Copper?
	13. Didymium.
	14. Erbium.
	15. Gold.
	16. Glucinum.
	18. Iridium.
	19. Lanthanium.
	20. Lead?
	21. Lithium.
	22. Molybdenum.
	23. Mercury.
	24. Nickel.
	25. Niobium.
	26. Osmium.
	27. Palladium.
	28. Pelopium.
	29. Platinum.
	30. Rhodium.
	31. Ruthenium.
	32. Silver.
	33. Strontium.
	34. Tantalum.
	35. Tellurium.
	36. Terbium.
	37. Thorium.
	38. Tin.
	39. Titanium.
	40. Tungsten.
	41. Uranium.
	42. Vanadium.
	43. Yttrium.
	44. Zinc.
	45. Zirconium.

The elements marked with a (?) are those which have either been occasionally detected in plants and animals, or which there are reasons for thinking would be found if sought for. Claims were at one time largely set up for arsenic, and lead, as present in all animals in small quantities, but those claims are now generally disallowed. A similar claim, but on better grounds, has been urged in behalf of copper, which is sometimes present in the human body, and is apparently never absent from some of the *Mollusca*, *Cephalopoda*, *Ascidiæ*, and *Crustacea*.*

Of the two missing non-metallic elements, Selenium, the analogue of sulphur, may be found accompanying the latter in the sulphur-compounds of the animal organism; and Boron, the salts of whose oxy-acids resemble those of carbon and silicon, may be associated with the alkaline carbonates and phosphates. Neither of these elements has as yet been sought for.

It may seem at first sight, questioning the sufficiency of the Chemist's "victorious analysis" to detect every ingredient of a complex whole, to hint that he may have missed certain organismal elements because he did not seek for them; seeing that he professes his ability to resolve an unknown composite substance into each of its ingredients, however numerous they may be, provided only they are all among the recognized sixty (or more) elements. But in reality, the Physiological Chemist has never done more than say, "*this* is present," and has always left a margin for those possible elements which had not been objects of search with him. No deliberative, exhaustive inquiry into all the elements of any plant or animal has ever been instituted, and till it shall be, a query may be put in every list of organismal elements over against all the so-called chemical simple substances; although it is manifest that, in the case of the human organism, we know all the elements which are present in *large* quantity in it. At the same time, when we find an organic compound so easily detected as sugar, overlooked, till very recently, in the secretions of the liver; and so familiar a substance as ammonia, after being positively pronounced, by the most skilful and impartial Chemists, to be totally absent from the blood, demonstrated, to the satisfaction of the most competent judges, to be one of its never-failing and most important constituents, we must avoid dogmatizing on what substances may yet prove to be essential ingredients, even of those organisms which have for the longest time been objects of study. And as quantity is no measure of value in the case of an organismal element, we must apply a similar rule to the rarest simple substances. More than five years of research have enabled me to demonstrate the univer-

* See in reference to the three metals in question, Lehmann's Phys. Chem. vol. i. pp. 449, 450.

sal distribution of Fluorine throughout the mineral, vegetable, and animal kingdoms, and especially its occurrence in the higher organisms; and at length, my results have received confirmation by M. Nicklès,* who is about to lay his observations before the French Academy.

It thus appears, that, as regards the *kind* or *quality*, of their component matter, living organisms, so far as we know them, consist chiefly of non-metallic matter; eleven out of the thirteen non-metals (including hydrogen) being found in them, whilst only six of the solidifiable metals have as yet been recognized among their components. If, however, Hydrogen is a metal, as there are so many reasons for believing it to be, and if Silicon is a metal, and as such better named Silicium, than the list of non-metallic bodies will be diminished by two, but they will still exceed the metals in number by three.†

So far again as *quantity* of component ingredient is concerned, the bulk and weight of all living Organisms are most largely made up of non-metallic matter; charcoal and oxygen specially preponderating.

In relation, thus, both to quality and quantity of constituent elements, Plants and Animals are mainly aggregations of Non-Metals: but this forms no point of distinction between them and a multitude, perhaps the majority, of minerals;‡ nor does it warrant any conclusion as to the metals which do occur in Organisms, being less important than their non-metallic elements.

Living Organisms then are not chance-medleys of elements of different kinds; nor do they consist of equal quantities of all the elements; nor do they contain in greatest quantity the elements which contribute most largely to the weight of the Globe.

It is true that as all plants consist chiefly of Charcoal and Water, the amount of Vegetable Matter on the Globe could not be large, if Carbon, Hydrogen, and Oxygen, were not abundant; and as the great majority of animals have much lime in their skeletons, their number could not be great, if lime were a scarce substance. But it certainly is not merely because charcoal, water, and lime are plentiful that they occur in living Organisms. On the other hand both plants and animals are found to reject substances which are in abundance about them, and to appropriate others which are scantily provided by nature, and can only be very slowly accumulated even in favorable circumstances. A Land plant, for example, finds in the soil which supports it much of the earth or oxide *Alumina*, and very little of the Alkalies potash and soda; yet it totally refuses to take any of the alumina, whilst it untiringly searches for and absorbs the alkalies; or dies if it cannot find them. A graminivorous animal finds in its food much Silica, yet with the exception of a very little in the hair, and mere traces elsewhere, silica is absent from all its structures. On the other hand it finds in its food very little phosphate of lime but it appropriates the whole of it, expending it on the nutrition of every tissue, but especially in constructing its bones.

If we had the means of comparing the weight of an elephant's tusk, say of 150 lbs., with the tons of vegetable matter which the animal had to devour, and the hundred weights of Silica which it had to reject, before it obtained a sufficient amount of phosphate of Lime to form the ivory of a single tooth, we should have a startling proof that there is no necessary connection between the quantity of raw material offered to an Organism, and the quantity of that material appropriated by it.

The illustration of this truth afforded by the rejection of Alumina by plants, and of Silica by animals is the more significant that it is strikingly at variance with common belief. Silica and Alumina together, constitute clay, and although this occurs in no plant or animal of any kind, all plants and animals,

* My papers on Fluorine are contained in the Transactions of the Royal Society of Edinburgh for April 6, 1846, and April 19, 1852, and in the Proceedings of the same Society for November 1846; likewise in the Reports of the British Association for 1846 and 1850, and in the Transactions of the Botanical Society of Edinburgh for 1852. I give these references in detail, because M. Nicklès is apparently unacquainted with any of my researches, and has deposited with the French Academy, a preliminary Note on "The Presence of Fluorine in the Blood," which, ten years after I had announced the fact, he claims as a discovery which he has just made made in November last. (*Journal de Pharmacie pour Décembre* 1856. Présence du fluor dans le sang par M. J. Nicklès. *Communiqué à l'Académie des Sciences, dans la séance du* 3 *November* 1856.)

† The recent interesting discovery by Wöhler and Deville, that Boron is crystallisable like Carbon in its diamond modification, and does not put on crystalline metallic characters, lessens the probability of Silicon proving to be a metal.

‡ Certainly the majority, if Silicon, which next to Oxygen is the prevailing element in Minerals, is not metallic.

and especially Man are held to have been created from it, and to revert to it after death. Not merely the vulgar but also the intelligent have agreed in interpreting the Sacred declaration that "the Lord God formed man of the dust of the ground," as signifying that man was made from clay. Theologians have often undesignedly contributed to the opinion, by mixing up with this simple declaration of a physical truth the purely metaphorical references of Scripture to "the earthly house of this tabernacle" and to mankind under God's sovereignty as resembling "clay in the hands of the potter." The doctrine, however, does not belong to Christendom. In many regions of the East, Adam is held to be a Red Man and made of red clay; nay, a specimen of such loam, brought from a traditional site of the Garden of Eden near the Euphrates, was recently offered in Edinburgh for chemical analysis, to see if it could be identified as Adamic dust! Shakespeare long ago counted upon a universal response when he made Hamlet too curiously consider, how

> "Imperious Cæsar dead, and turned to clay,
> Might stop a hole to keep the wind away;"

and our latest and greatest poetess, in her Aurora Leigh, makes her hero Romney exclaim,

> "Dear Marian, of one clay God made us all,
> And though men push and poke and paddle in't,
> (As children play at fashioning dirt-pies),
> And call their fancies by the name of facts,
> Assuming difference, lordship, privilege,
> When all's plain dirt,—they come back to it at last;
> The first grave-digger proves it with a spade,
> And pats all even."*

The belief is a very natural one, for no dust is more abundant than clay-dust; and plants live with their roots buried in clay, and on plants all Animals, including Man, feed directly or indirectly; yet the belief is without any foundation. Dust we are, and unto dust we shall return, but not into clay.

The selecting power which thus characterizes the vegetable and animal worlds each as a whole, is not less strikingly shown when we compare genera with genera, or species with species, as to their component ingredients. In every botanic garden one may see plants requiring very different kinds of food growing side by side and living on the same soil. Botanic gardens would be impossible but for this. If we had not only to bring the palm from South America, and the camellia from China, but also to import the very earth in which they grew, our richest gardens would exhibit a very meagre show. We stole the secret of porcelain-making from the Chinese, but it did us no good, till in a few widely-separated places in Europe we discovered porcelain-clay. But the camellias, the azaleas, and tea-plants of China take as kindly to British earth as if they had never known any other; and the palms, if they sigh for brighter skies, and for breezes with warmer breaths, make no complaint against the soil or water of England. Botanic gardens are possible, because, provided their soils contain all the ingredients of plants, each will select for itself exactly what it requires.

Zoological gardens are possible for a similar reason, and illustrate the same truth. The naturally carnivorous cat may be accustomed to a vegetable diet, and the naturally graminivorous horse or ox to an animal diet, provided in both cases no ingredient essential to life is wanting, for the selecting power resident in each organism will prevent it from injuriously losing or gaining by the change.

A still more striking example of selective action is afforded by the plants and animals which simultaneously develop themselves from the same medium, such as the sea. In any rocky pool, when the tide is out, and in every thriving drawing-room aquarium, one may find the graceful plants which we call sea-weeds sipping from the mingled waters their daily fractional dose of iodine; housed sea-snails sucking from it carbonate of lime for their shells; restless fishes extracting from it phosphate of lime to strengthen their bones; and lazy-like sponges dipping successfully into it for silica to distend the mouths of their filters.

Thus, no creature is a fortuitous concourse of atoms. Each is as definite and constant in its chemical composition as it is in its mechanical structure, or its external form. A bird does not more certainly in successive generations instinctively build its nest in the same way, than from the first moment of its embryonic life it unconsciously builds its own body out of the same materials, gathering lime to its bones, iron to its blood, and silica to its feathers.

In this way, through unnumbered cen-

* 1st. Edn. p. 139.

turies, each tribe of organisms has from the period of its creation followed in its structural development, a chemical formula of composition, which in the same species is constant, within narrow limits, for every one of its members, so that each plant and animal has a chemical as well as an anatomical individuality. On analyzing an organism, we find certain substances, and only these, present; and we have made some progress, though as yet it is but small, in establishing the quantities in which those chemical constants occur in different species. I have called them "constants" because the first, and, perhaps, the fullest proof that a chemical element is essential to an organism, is its invariable presence in it. A criterion like that by which *Vincentius Lirinensis* proposed to test Catholic religious doctrine is applicable here. *Quod semper, quod ubique, quod ab omnibus.* Whatever chemical element is found in all the individuals of a species, at all times, and in all places, is essential to each individual. This criterion requires only the qualification that neither plant nor animal can prevent non-essential substances from entering its body along with its food, and in the air and water on which it so largely lives; so that if we analyse it whilst it is thus traversed by a non-essential element, we may mistake that for an essential ingredient. But if this unwelcome visitant be not so poisonous as to kill the subject of its intrusion, in which case analysis would be out of the question, it will soon be dismissed, for every organism has as positive a power of refusing as of choosing, and its house is its castle. It would be foolish, accordingly, to act like the census-collectors who count every one a member of the family, whom they find within its house at the moment of knocking at the door. We must, as when analysing inorganic individuals such as crystallized minerals, select various examples from different localities, and analyze each. The essential ingredients may then be readily distinguished from the incidental, as well as the extent to which one element is replaceable by another without departure from the specific chemical type. A chemical formula thus reached, will one day characterize organic species, as it now does inorganic ones.

Within the limits of variation which such analysis will show, every element discovered in a plant or animal must be regarded as essential to it. The endeavor of some to rank the ingredients found in an organism as important in proportion as they are present in large or small quantity, is plainly fallacious. Assuredly no substances are more important to all classes of organisms than hydrogen and oxygen, which during life predominate in them; but we are entitled to affirm that the water of which the blood chiefly consists is a more important vital constituent, than the common salt and the iron which are found in it. Blood is as invariably saline and ferruginous as it is aqueous; and it would be as unwise to disregard the iron because its amount is small, as it would be to hold the mortar in a building useless, because its weight is insignificant compared with that of the stones which it binds together; or to disregard the nails, because they are few, which unite the planks of a vessel; or the threads, because they are scanty, which convert a dozen furs into a single garment.

On the other hand, seeing that the more powerful any agent is, the less of it is needed to produce a given effect, very potent chemical elements cannot be expected to occur in large quantities, and hence some have proposed to consider the least abundant ingredients of an organism as those most valuable to it; so that fluorine and silicon would occupy the highest place among the elementary constituents of the animal frame. It is needless to enter into an elaborate refutation of this view. We know that 1 unit by weight of hydrogen is equal in *chemical* power to 200 such units of a closely analogous body quicksilver. There is no preponderance of such power on the part of either, but only perfect equality, so that we speak of one and two hundred as the chemical *equivalents* of these bodies. Quicksilver may represent an abundant organismal element, when contrasted by equivalent with hydrogen, held to represent a scanty one, but neither chemically excels the other in such proportions; to compare the chemical powers of equal weights, is to transgress the first law of quantitative chemistry. We must in the meanwhile be content to ascertain in what proportions the elements of organisms occur in them, with no prejudice in favor of scanty or abundant occurrence as a measure of importance.

Seeing, then, that every plant and animal

is an edifice like the temple of the Hebrews, built of stones squared and fashioned for their respective places before they were put together, we cannot forbear the question why were certain building materials chosen rather others? This choice can have been made, no matter how brought about, only because of a peculiar fitness which they possessed beyond those equally accessible, to which they were preferred. Let us try the point in a case or two, and in the following way, limiting ourselves to the human organism.

Suppose an intelligent person, quite ignorant of both chemistry and physiology, to be taught as much of the latter science as can be learned without an acquaintance with the former, and then to have shown him the properties of all the chemical elements and their chief compounds, after which he is requested to state which of those elements is most likely to occur in the human frame.

Avoiding all minute details in reference to structural peculiarities, and not even appealing to the microscope; (for it would be premature in the present state of our knowledge to attempt to explain the chemical changes which attend the development and metamorphosis of cells;) the physiologist is content to teach his pupil the great general laws which regulate the changes of the human organism during life; such for example as the following.

The living body of man unites in itself the contrasted and apparently incompatible qualities, of great stability and great mobility. It is so stable that it can last for threescore years and ten; for a hundred or more; maintaining its sharply defined individuality all the time. It is so mobile that it does not consist of entirely the same particles during any two successive moments. The dead matter of the outer world, it is ever changing into its own living substance, and its living substance it is ever changing into dead matter which, as alien to itself it returns to the outer world. Like the heavenly bodies, it undergoes a series of secular variations, which carry it with continually altering conditions through the several phases of embryonic, infant, adolescent, adult and senile life. Like certain of the heavenly bodies, also, it describes a diurnal revolution, knowing the alternations of sleep and waking, hunger and satiety, activity and rest. The reproduction of its kind involves a peculiar series of very complex changes especially in the materna. organism. Mechanical injuries disabling or destroying organs and tissues require the manifestation of corresponding reparative processes. Disease, equally defacing and destructive, demands a countervailing *vis medicatrix* to neutralize its violence; or rather, disease is a battle between the organismal elements which are quick at finding a *casus belli* and are very rarely at perfect peace with each other. Everlasting change and yet fixity. Unceasing struggle and yet no schism. Civil war and yet no anarchy. These unlike conditions are realized and harmonized, every moment, in our fearfully and wonderfully made bodies.

If we reduce those apparent incompatibles to their simplest expression, we shall perhaps find it in this. Physically, the human organism is an aggregation of solids and liquids which are continually changing into each other; the solid melting into the liquid, the liquid congealing into the solid; whilst both stand so related to the air which is the breath of life, that they are continually vaporizing into gases, and gases are continually liquefying and solidifying into them. When Hamlet exclaimed,

> "O! that this too, too solid flesh would melt,
> Thaw, and resolve itself into a dew,"

he was preferring a request which was granted before it was preferred, and which is every moment receiving fulfilment in each of us. Blood is liquified muscle, sinew, nerve, brain, and bone. Bone, brain, nerve, sinew, and muscle are solidified blood; and at every moment flesh is becoming blood, and blood flesh. The current in our veins is at once a River of the Water of Life, feeding and sustaining all that grows along its shores, and a River of the Water of Lethe quenching in oblivion everything that it touches. Like the Nile or the other great rivers of the world, it is at the same time wearing down hills, and building up continents; but with this difference, that whereas the Nile is only destructive among the mountains of Abyssinia, and only constructive in the plains of Egypt, the blood at every point in its course is simultaneously adding and abstracting. Those wondrous crimson barks or wood-cells which navigate the arteries are keen traders, and follow the rule of the African rivers, where sales are effected only by barter; but they add to this rule, one peculiar to themselves,

which neither civilized nor savage men cares to follow, namely, that they give away new goods in exchange for old. Here the traffickers on the Red River deposit fresh brain-particles, to replace those which the immaterial spirit has sacrificed to the expression of its thoughts: for Jeremy Taylor taught a great physical truth when he declared long ago, that "while we think a thought we die." The eloquent preacher saw death near us at every moment, and nearer at each than at the moment before; but death is *in* us at every moment, and it is not merely *whilst*, but *because* we think a thought we die. Alas! that we cannot be content with such innocent self-slaughter, which the river of life in our veins forgives into resurrection in every case as fast as it ripples along. It cannot help us, if we overthink ourselves and die before our time, but during life its mariners deal in all vital wares. As fast as the blacksmith wastes his muscles by each blow, they barter against the spent cordage of his arm, new flesh-particles to make it strong as before; they restore to its integrity the exhausted auditory nerve of the musician, give the painter a new retina, and the singer a new tongue. Wherever, in a word, the million lamps of life, which keep up its flame at every point of the body, have burned to the socket, they are replaced by freshly trimmed ones; nor is it here as with the barter of Aladdin's Lamp. The New lamp is in this case the magic one; the Genie has departed from the Old.

Chemically, again, the human organism is the continual subject of swift changes of its composition in opposite directions. One half of the blood, which is in the arteries, is always in one chemical condition; the other half which is in the veins, is in another direction: and the whole blood is at all times rapidly transferred through these alternations. The arterial blood is charged with oxygen; the venous with carbonic acid. These gases are partly the causes, partly the effects, partly the indices of chemical differences between the two bloods, which affect probably more or less all their respective ingredients. At one half revolution of the circulation, they are changed in one way at the capillaries of the lungs, whilst oxygen is absorbed: at the other half revolution they are changed in another way at the capillaries of the system, whilst oxygen is lost and carbonic acid takes its place.

There is thus continual addition of matter to the body, and continual withdrawal of matter from it; but apart from this, and within the ring-fence of its own organism, a process of combustion, and one the very reverse, are going on together. Our bodies are at all times like the fire which was shown to the hero of the Pilgrim's Progress in Interpreter's House, which had water poured on it, on one side of the wall against which it blazed, and oil on the other. Here one tissue is burning like fuel, and there another is becoming the depository of combustible matter. We have, as it were, millions of microscopic wind-furnaces, converting into carbonic acid, water-vapor, and other products of combustion, all the combustible elements of the body, and millions of blast-furnaces reducing the starch and sugar of the food, and the sulphates and phosphates of the body, into inflammable oils and other fuels, which are finally transferred to the wind-furnaces and burned there. Burning, and what we must call in contradistinction, *unburning*, thus proceed together; the flame of life, like a blow-pipe flame, exhibiting an oxidizing, and a reducing action, at points not far distant from each other.

There are thus as concerns the organism, continual addition and continual abstraction; continual physical alternation of liquefaction and solidification; continual chemical alternation of combustion and reduction. The blood-vessels are at once the water-pipes of the city of Mansoul, bringing fresh springs into it, and the drain-tunnels carrying all that is waste and useless away. The heart is the one true conjuror's bottle, pouring forth, aye and at the same time, liquids the most unlike to satisfy thirsts as strange; saliva to wet the lips, tears to relieve the eye, milk to swell the mother's breast, and oil to make supple the wrestler's limbs. The whole organism is, as the older writers loved to call it, a *Microcosm* or world in little, where in one land they are rejoicing, and in another weeping; where on this shore they are singing Te Deum, and on that shore Miserere; where at the same moment it is "a time to love, and a time to hate, a time of war, and a time of peace."

Such is the human body, ever changing, ever abiding. A temple, always complete, and yet always under repair. A mansion, which quite contents its possessor, and yet

has its plan and its materials altered each moment. A machine which never stops working, and yet is taken to pieces in the one twinkling of an eye, and put together in the other. A cloth of gold, to which the needle is ever adding on one side of a line, and from which the scissors are ever cutting away on the other. Yes! Life like Penelope of old is ever weaving and unweaving the same web, whilst her grim suitors Disease and Death watch for her halting; only for her there is no Ulysses who one day will in triumph return.

If the imperfect description which has been given of the human organism is in any respect faithful, it is manifest that the chemical elements which enter into its composition must exhibit the contrasted stability and mobility which so strikingly characterize itself. Suppose, then, our physiologist's pupil, guided by this rule, to study the chemist's elementary bodies, with a view to discover which of them are most suited to the living frame. Is it likely that among the sixty he would select only seventeen? that he would select the actual seventeen which are found? that he would even prefer non-metallic to metallic matter? or assign any place to abundant constituents, such as the metal of lime, or to never-failing unabundant ones, such as fluorine? He would probably select air and water, but beyond these I feel quite unable to surmise how far his Frankenstein would agree in composition with the Homo Sapiens of Linnæus. At all events, the chances are very great that he would pass over entirely that remarkable group of elements, in which two of the most characteristic ingredients of all animal organisms are included. This group contains four bodies, Phosphorus, Arsenic, Antimony, Nitrogen, with an outlying fifth one, Bismuth, which I do not at present consider; and, in the whole category of elements, no four at first sight seem more unfitted for organismal constituents than they. Phosphorus has been known for two centuries as a dangerous combustible, and most deadly poison, which the recent sad, and often fatal experience of the lucifer-match makers has shown to possess a peculiar antipathy to the bones, for when it can reach them, as it can those of the jaws, it rots them away. On the poisonous properties of arsenic it is quite needless to dwell. Antimony, or Anti-Monk, betrays by its name a deadliness to man, akin to that of its name sister, Monkshood, a still more potent killer; and for both, all men are monks. Nitrogen, on the other hand, has seemingly no properties at all; a light, thin, tasteless, insipid, insoluble, incombustible gas, to appearance good for nothing, and as such fitly symbolized in chemical tables by the letter N. Two Murderers, a dangerous Mediciner, and an Incapable, are surely not the parties to whom any one would propose to entrust our lives? Yet the fiery phosphorus and the negative nitrogen, are the two elements which, by their greater abundance in animals, and the part which they play there, most strikingly distinguish animals from plants; and they are specially important in relation to the human organism. When, moreover, we study those two elements more particularly, they singularly change characters; Phosphorus, on a closer acquaintance, proving to be a very healthful and friendly occupant of the body, Nitrogen prone to conceal under its look of helpless indifference the most energetic powers of making and marring, so that when occasions calls, it proves better at killing and slaying than any one of its more demonstrative brethren.

Into a more detailed consideration of these elements I will now enter, in the hope of showing, that though we might not have anticipated their presence in our bodies, we can point out many reasons why they actually are there. First of phosphorus. Its importance to the human organism is shown, 1st, by its invariable presence in it; 2d, by the abundance of its presence; 3d, by the universality of its presence; 4th, by the diversified manifestations of its presence; 5th, by the active part which it takes in the most energetic vital processes, such as absorption, secretion, nutrition, reproduction, sensation, emotion, and all the other forms of nervous or cerebral action; 6th, by the invariable loss of health which attends its withdrawal from the body; 7th, by its efficacy as a restorative. A substance which is alike present in the hardest bone and the most pulpy nerve, which occurs in one form or rather series of forms in the blood, in another series in the flesh-juices, in a third in the milk, in a fourth in the brain, and probably in other modifications elsewhere in the organism, and which is associated with all its critical changes, must be pre-eminently serviceable to the body.

Phosphorus occurs in all organisms chiefly as phosphoric acid, in union with water, with mineral and organic bases, with fatty bodies, and in other forms of organic combination as yet little understood. The following exposition of the properties of the element and its chief organismal compounds may illustrate why it is so serviceable to the body.

I. Phosphorus is remarkable for the Protean shapes which it can assume. Some elementary bodies, such as gold, are familiar to us in one form, and that so beautiful that we are not curious to inquire whether the metal can assume other and less noble shapes. In truth we have but recently fully realized that a multitude of the chemical elements can masquerade in disguises, through which we with difficulty realize their individuality. Among those masquerades a first place must be given to the element under notice.

Since about 1660 we have been familiar with phosphorus as a soft semi-transparent nearly colorless wax-like substance, possessed of a glassy structure, exhaling in the air an odor of garlic, shining even at the freezing point of water, melting a hundred degrees below the poiling point (111°5 F.) of that liquid, bursting into flame in the air at a temperature a little higher, and yielding a thick white smoke condensing into a snow of phosphoric acid. This form of the element we have learned to distinguish as vitreous phosphorus. It is so inflammable, that it can be preserved with safety only under water, and there is scarcely a chemist who has not been in some degree a martyr to its flames. It is so poisonous that not a year passes without some poor child falling a victim to the minute portion which it thoughtlessly eats from a lucifer-match, and without some uncautioned lucifer-match maker suffering the prolonged tortures of slow poisoning, which its daily administration in infinitesimal doses infallibly occasions. It reacts so powerfully upon the air in which it is permitted to fume, that it changes its oxygen into the energetic, oxidizing, deodorizing and bleaching agent which is known as ozone. In a word, it exhibits in an intense degree an affinity, or tendency to combine, alike with metals and non-metals, and strikingly alters each by its union with it.

In so far, then, as mobility, or susceptibility of various change is concerned, no one will question the fitness of phosphorus to become an organismal element. But till recently we had not discovered that it can change this mobile, restless, agonistic condition, for one of passive indifference and great stability.

Recent researches have shown that vitreous phosphorus is susceptible of no fewer than five modifications.

1st, It may be altered from the glassy to the crystalline condition.

2d, By exposure under water to air and light, it becomes a *white*, opaque, sparingly fusible body.

3d, By fusion and sudden cooling at a comparatively low temperature, it becomes *black* and opaque.

4th, By elevation to near its boiling point, and sudden cooling, it becomes viscid like sulphur in the same circumstances, and retains for a considerable period a consistence like that of caoutchouc.

5th, By exposure to the ray of the sun in a vacuum, or in a gas free from oxygen, or in water free from air, and excluded from air, it changes into an amorphous *red* solid.

Thus we know phosphorus as

1. A symmetrical crystal.
2. A true vitreous body, or glass.
3. A soft elastic substance like caoutchouc.
4. A white amorphous solid.
5. A black amorphous solid.
6. A red amorphous solid.*

The crystalline phosphorous and the vitreous closely correspond in chemical characters, and we know little of the elastic, the white and the black varieties; but the possibility of producing them illustrates how susceptible phosphorus is of many modifications, and in the red amorphous modification we have an indifferent form of the element, so unlike that in which we are accustomed to see phosphorus, that though it has been in the chemist's hands for more than a century, he has only very recently recognized that it is phosphorus.

It is now, however, manufactured on the large scale,† so that its properties may be

* See Gmelin's Handbook of Chemistry, Cavendish Soc. Trans., article *Phosphorus*. Prof. W. A. Miller's Chemistry, vol. ii. p. 593. Graham's Chemistry, vol. i. p. 431.

† Messrs. Albright, near Birmingham, have for the last five or six years prepared red phosphorus according to Schrötter's process, which they have patented. I am indebted to these gentlemen for the opportunity of examining large specimens of this important substance, which promises, by its comparative harmlessness, to render the manufacture, use, and carriage of lucifer matches much less dangerous than they are at present.

stated and illustrated in full. It is neither crystalline nor glassy, but amorphous, and heavier than the familiar forms of phosphorus. It does not shine at the heat of freezing water, nor melt even at that of boiling water. It exhales at ordinary temperatures no vapor and no odor, nor does it become oxidized in the air, or change it into ozone. It is not poisonous even when directly administered in doses a hundred times greater than those which are fatal with vitreous phosphorus, and it may be handled with impunity. Towards other elements it shows in general a singular indifference, nor is it till we raise it to the temperature of 500° F., some 470° above the heat necessary to make vitreous phosphorus begin to burn, that it starts into activity, bursting into flame, and yielding phosphoric acid. It appears to owe its peculiarities to the presence in it of much latent heat, so that it differs from vitreous phosphorus, as steam does from water, and water from ice, for it is most easily produced by long maintenance of the common phosphorus at a temperature below 490°, and when heated above this point it suddenly bursts into vapor, changing with evolution of heat into the familiar modification of the element. But it can be produced by a brief exposure of the vitreous phosphorus to light, in a vacuum or non-oxygenous atmosphere, and when common phosphorus is kindled in air, it always changes in part into the red amorphous modification, which remains when the non-amorphous portion has burned away; and some interesting researches of Professor Brodie appear to prove that the change may attend the combination of phosphorus with other bodies.

Here then is an element which can imperceptibly and quickly pass from a condition of great chemical activity to one of great chemical inertness. I suggest this susceptibility of change as one reason why phosphorus is a predominant organismal element. Without insisting on its sixfold mutability, let its twofold mobility, of which we are quite certain, be kept in view. Phosphorus, in virtue of this, may follow the blood in its changes, may oxidise in the one great set of capillaries, and be indifferent to oxygen in the other; may occur in the brain in the vitreous form, changing as quickly as the intellect or imagination demands, and literally flaming, that thoughts may breathe and words may burn; and may be present in the bones in its amorphous form, content, like an impassive caryatid, to sustain upon its unwearied shoulders the mere dead weight of stones of flesh. And what is said here of the brain, as contrasted with the bones, will apply with equal or similar force to many other organs of the body. All throughout the living system we may believe that phosphorus is found, at the centres of vital action in the active condition, and at its outlying points in the passive condition. In the one case, it is like the soldier with his loaded musket pressed to his shoulder, and his finger on the trigger, almost anticipating the command to fire; in the other it is like the same soldier with his unloaded weapon at his side, standing at ease.

Phosphorus will react also on other bodies, according to its own condition; and as it appears that vitreous phosphorus not only oxidises with great rapidity when it encounters air, but at the same time changes that air in part into ozone, *i.e.*, greatly exalts its oxidising power, it will be seen that the quick oxidation of phosphorus within the organism may often imply the simultaneous quick oxidation (through the ozone it generates) of all the surrounding oxidable substances.

It is premature to speculate on such matters, but it is desirable to notice emphatically, that physiology has not yet recognized the importance of that susceptibility of molecular change which chemists specify by the name of "Allotropy." It increases alike the difficulties and the resources of biology. Hitherto, we have begun with each element as if it had one narrowly-defined set of sensible characters, which we have briefly enumerated; and thereafter we have proceeded to consider its chemical compounds, with the exposition of which our zoo-chemical demonstrations have commenced. But now it appears that what we regarded as the basement floor, level with the ground, was at least one story above it, and when we dig away the sand, we find vault covering vault, and know not as yet how many stories lie below. Among organismal elements, not only phosphorus, but oxygen, carbon, sulphur, and chlorine are known to admit of molecular modifications. The tendency, indeed, of discovery is to show that every chemical element is in this predicament, for every day adds to the number of allotropic substances. Moreover, we can confidently affirm, that when they enter into combination, the compounds which they form often reflect

the image of the modification which characterized the element at the moment of its combination, and that we may have oxides, for example, of the same composition (so far, at least, as ponderable constituents are concerned), yet very different in property.

As pre-eminent among the possessors of this variability, phosphorus is more suitable than any element we yet know, to minister to the unchanging change of the living body.

It is not, however, as elemental phosphorus, intricately combined with organised molecules in ways which the chemist cannot interpret in his study or imitate in his laboratory, that this organismal constant chiefly occurs. As already stated, it is present in living bodies chiefly as its highest oxide, phosphoric acid.

When a bone is burned to whiteness in the open air, it yields a crumbling chalk-like solid, significantly called bone-earth of which the larger part is lime, whilst the remainder is in great part phosphoric acid. This acid can be separated from the bone-earth, by pouring oil of vitriol upon it, and its properties as the dominant acid of all the higher sentient organisms, are now to be considered.

Phosphoric acid has all the properties of the most powerful acids. It dissolves in water. It is intensely sour. It reddens all acidifiable vegetable blues. It perfectly saturates powerful bases. In these respects it agrees with sulphuric, nitric, hydrochloric, and acetic acids. But from all other acids possessing such properties, it differs in several singular ways, and these differences point to to the cause of its organismal pre-eminence.

The first remarkable difference is its freedom from corrosiveness. The acids named above, even when considerably diluted with water, rapidly disintegrate organic bodies, and in their strongest aqueous dilutions, act like hot irons on the skin. A drop of oil of vitriol, or of the strongest aqua fortis, burns the flesh like a live coal, and unless mingled with much water, excites painful and dangerous inflamation of the tissues. But the phosphoric acid extracted from bones, even when combined with a chemical minimum of water, and concentrated into a crystallisable hydrate, may be spread for a considerable time over the thinnest skin of the living body without burning, paining, or inflaming it. It is thus of all the strong acids we know, the only one which can be set free, and that in a concentrated form, within living organisms, without causing their destruction. In this peculiarity I find one cause of its universal presence in the body; for whatever services an acid can render to an active organism phosphoric acid can render to the full without harming it.*

A second peculiarity of phosphoric acid is, that unlike the majority of equally strong acids, it does not coagulate albumen. And as this substance, familiar to all in white of egg, is largely present in the flesh, the natural juice of which contains partially neutralised phosphoric acid; † and is also largely present in the brain and nerves, associated with a modification of the same acid known as oleo-phosphoric acid; we can affirm at least that the solitary potent inorganic acid compatible with the non-coagulation of albumen, is the only one found in a free (or at least partially free) state, in association with the liquid form of that important organismal constituent. These peculiarities, however, are as nothing compared with the third, which calls for special notice. The majority of acids which are soluble in water exhibit their characteristic properties most markedly when associated with the chemical minimum of water which can combine with them, and when more water is added, they show in a less degree, according to their dilution, such qualities as sourness, power to alter vegetable colors, and to saturate bases. There is thus but *one* sulphuric, or nitric acid. The less water united with either, the more powerful it is, and the greater the weight of base it can neutralize. In the language of quantitative chemistry, one equivalent (or chemical unit) of nitric acid can combine with one equivalent of a base, neither more nor less. This is the general rule. One unit by weight of an acid unites with one unit of base, and here the neutralising power of the former stops, so that as dilution by water implies the spreading of the efficacious unit over a wider area, a given weight of diluted acid must neutralize a smaller weight of an undiluted base than the same weight of stronger acid will neutralize. Hence, the less amount of water, the greater the acidity of the acid; and unit of acid to

* It seems worth the consideration of surgeons, whether common phosphoric acid, in virtue of its unirritating action on living tissues, and its solvent action on phosphatic calculi, may not as a *litholytic* be brought in direct contact with vesical concretions of the non-acid class, and render in some cases operations unnecessary.

† The tribasic, acid phosphate of potash (2 H O, KO x PO ^{5}.)

unit of water is the condition of greatest strength.

But to this widely applicable rule phosphoric acid forms a remarkable exception. It is most acid when united not with one, but with *three* units of water. In this condition t is extracted from bones, and found (at least after death), in the blood and flesh. One unit of the acid crystallises along with three units of water, and retains these in special combination to whatever extent it is diluted with more water. Its neutralising power, moreover, is correspondingly threefold, so that, for example, in the bones, one equivalent of it is combined with three equivalents of lime, whilst all the other bone-acids are united in single units, with a single unit of lime. An endless series of salts similar to bone-phosphate, but containing other bases than lime, are known to chemists, who distinguish them as a class, as the tribasic phosphates. The organismal importance, however, of this property of phosphoric acid will not appear till we look to a fourth peculiarity which it possesses.

Phosphoric acid has the singular power of dropping or casting off, as it were, one of the three units of water which it is able to retain, keeping only two, and refusing, even though dissolved in volumes of water, to take back the third. In this modification (which is known as pyro-phosphoric acid), it has not a threefold, but only a *twofold* power of neutralising bases, so that, for example, as it occurs in burnt bones, one equivalent is united with but two equivalents of magnesia, and an extensive series of corresponding salts is known, distinguished as the bibasic phosphates.

But further: pyro-phosphoric acid can part with one of the two units of water which it characteristically retains, as common phosphoric acid can part at once with two of its three characteristic units of water, both becoming, like the ordinary mineral acids, a compound of unit of acid to unit of water, with a onefold power of neutralising bases. This modification has been called meta-phosphoric acid. It also forms a large series of salts all containing one equivalent of acid to one equivalent of base, and distinguished as monobasic phosphates.

Meta-phosphoric acid, unlike the other hydrates of the acid, coagulates albumen. Dissolved in cold water, it slowly takes to itself two additional units of that body; and if boiled with the liquid, it takes them with great rapidity.

We have thus to begin with a snow-like soft solid, called anhydrous phosphoric acid, procured by burning dry phosphorus in equally dry air. When we dissolve it in water, it so unites with that liquid as to produce, according to circumstances, three acid solutions, as distinct from each other in all their properties as if they were composed of totally different ingredients. These three solutions, distinguished as common phosphoric, pyro-phosphoric, and meta-phosphoric acids (of which the first two are crystallisable as solids), are mutually convertible by loss or gain of two units or chemical equivalents of water; the first named, which retains three such units, being the most stable, and the last, which retains but one aqueous unit, the least so.* The chief organismal acid is thus equal in powers to three ordinary acids, and strikingly exhibits the quality of mobility or variability, which has been shown to be so essential to the active components of living organisms. Yet triply potent as phosphoric acid is, it does not, in any of its modifications, exhibit corrosiveness or poisonousness This has already been referred to as characterising the tribasic acid, but is still more remarkable as characterising the bibasic and monobasic acid, for the general rule is, that the less the amount of water in a hydrated acid, the more caustic, corrosive, and poisonous it is. But even anhydrous phosphoric acid half-deliquesced, may be kept in contact with the skin for an hour without injury, where the similar hydrate of sulphuric acid would in a few minutes reduce the tissue to charcoal.

The innocuousness, indeed, of the strongest phosphoric acid is, in many respects, as in-

* The three hydrates of phosphoric acid, taken in the same order as in the text, are best distinguished as tribasic, bibasic, and monobasic phosphoric acid, according to the momenclature of Thomas Graham, Esq., Master of the Mint, our greatest authority on the subject. On the binary theory of acids and salts, each of Mr. Graham's hydrates is represented as a peculiar hydracid:—

Thus, Tribasic Acid . . . $PO^8 \times H^3$
Bibasic Acid . . . $PO^7 \times H^2$
Monobasic Acid . . $PO^6 \times H$

It is quite immaterial to the argument pursued in the text, which of the rival theories of acids is adopted. On both views the same weight of the same three ingredients, phosphorus, oxygen, and hydrogen, is recognised as present: The only matter in dispute is, the mode in which the ingredients are arranged. Mr. Gaaham's view is preferred as the one more easily followed by those who have not made chemistry a special study.

explicable as it is paradoxical. Chemists refer the caustic action of strong sulphuric, nitric, hydrochloric, and acetic acids, in great part, to their intense affinity for water, which they compel the organic bodies touched by them to give up, so that their chemical integrity is destroyed. But the water which these corrosive acids take from an organised structure, anhydrous phosphoric acid can take from them. The most caustic acids known to us are probably sulphuric and hydrofluoric acid, but the strong hydrates of both are rendered anhydrous by phosphoric acid, which nevertheless does not possess a trace of their causticity. It has latterly come into extensive and most important use among scientific chemists, as a means of dehydrating or rendering waterless other substances, so remarkably does it excel them in affinity for water, and yet the powers which they owe to such an affinity are not exhibited by it. It is thus a lord paramount among acids, compelling its barons to surrender to it the prey which they have taken from the innocents, but never found robbing the innocents itself.

There is much indeed, as yet unaccounted for, in the relation of phosphoric acid to water. One should expect such a substance to dissolve in this liquid with the greatest rapidity; yet the anhydrous acid, though it hisses like hot iron when it meets water, and shows by the heat which it evolves, an intense affinity for it, seems to retain that affinity only for a moment, and to have its thirst quenched by the first draught, or rather sip of liquid, for it dissolves slowly, like snow which has barely reached the thawing temperature. Anhydrous sulphuric acid, on the other hand, not only undergoes aqueous solution with great energy and rapidity, but, long after it has acquired its unit of water, continues eagerly to combine with more, absorbing its vapor from the atmosphere, so as to desiccate every thing in its neighborhood; and the other strong acids have a similar power. Phosphoric acid is thus like a feverish child, begging for a great bowl of water, but pushing it away the moment it lips are wetted. Sulphuric acid is like the sufferer from a gunshot wound, whose insatiable craving for water, no number of goblets can appease; and yet the former acid can drink the latter dry.

Whatever be the explanation of this anomaly, the important fact remains that phosphoric acid is at once more powerful than strong sulphuric acid, and less irritant than weak vinegar, so that it can innocently traverse every part of the body. But of what service it may be asked is it to the body, to be traversed by an acid whether innocuous or irritant? To this, in the meanwhile, it will be sufficient to reply, that the chief chemical compounds in the organism either are or contain salts, which are produced by the union of acids with bases. A great part therefore of organismal chemistry is the chemistry of acids; and we are now to look at the way in which phosphoric acid, when it ceases to be free and unites with bases, serves the organism by the kind of salts which it forms. Common or tribasic phosphoric acid, *i.e.*, 1 unit of anhydrous phosphoric acid combined with 3 units of water, can exchange these in whole or in part for units of base.* It may exchange the water entirely for one base, as it does when it forms the bone-phosphate of lime, which consists of 3 units of lime to 1 of anhydrous phosphoric acid; or it may give away only two units of water, receiving in return the same number of units of base, as in the phosphate of soda of the blood, which consists of 2 units of soda and 1 unit of water, added to the constant unit of anhydrous acid; or it may give away only 1 unit of water and receive in return 1 unit of base, as in the phosphate of potash of the flesh, which consists of 2 units of water, and 1 of potash to 1 of acid. Moreover, where 1 unit of water is retained, each of the 2 given away may be exchanged for a separate base as in microcosmic salt, where 1 unit of soda, 1 unit of ammonia (oxide of ammonium), and 1 unit of water, are together combined with 1 unit of acid. The same acid thus forms, by variations of base, soluble, insoluble, acid, alkaline, and neutral salts. Further: whereas with the same base, ordinary acids form but one salt, or compound, tribasic phosphoric acid can form three. Thus, whether we add caustic soda or carbonate of soda, or muriate of soda (chloride of sodium), to sulphuric acid, we obtain the same Glauber's salt or sulphate of soda containing 1 unit of acid to 1 unit of base. But if we evaporate together

* Strictly speaking, the water is acting as base, so that the exchange is of units of aqueous base, for units of some other base, but as it might confuse the general reader to call water a base, I have avoided this mode of expression although it is the customary one among chemists.

tribasic phosphoric acid and caustic soda, we obtain a salt with 3 units of soda to one of anhydrous acid: if we pour on carbonate of soda the tribasic liquid, we obtain a salt containing 2 units of soda (and one of water) to 1 of anhydrous acid; and if we substitute muriate for carbonate of soda, we obtain a salt containing 1 unit of soda (and 2 of water) to 1 of anhydrous acid. Muriate and carbonate of soda are both largely present in the body, and phosphoric acid must continually encounter them, but it will form a different salt with each, where sulphuric and all ordinary acids would form the same salt with both.

Once more: when tribasic phosphoric acid by parting with 1 unit of water becomes bibasic, it may form salts with 1 unit of water and 1 of base; or with 2 units of the same base; or with 2 units each of a different base; and when the tribasic acid parts with 2 units of water and becomes monobasic, it can act the part of an ordinary acid. Moreover, without loss or gain, but only by a new arrangement of particles, a hydrated phosphate of one class may change into a phosphate of another.

Even this lengthened statement does not exhaust the modifications of phosphoric acid; two additional classes of salts have been described,* and phosphates of different classes can unite *as salts* with each other. The number accordingly of possible phosphates is beyond calculation, and the quality of variability appears at its maximum in the compounds of phosphoric acid.

Limiting our attention to the well-known modifications of phosphoric acid, we may sketch in outline how they may render service to the body. The sketch can be only a fancy-picture, yet it may be one mirroring and shadowing, however faintly, the reality of nature.

A child is beginning to walk and the bones of its limbs must be strengtened and hardened. Phosphoric acid accordingly carries with it 3 units of lime to them, and renders them solid and firm. But the bones of its skull must remain comparatively soft and yielding, for it has many a fall, and the more elastic these bones are, the less will it suffer when its head strikes a hard object, so that in them we may suppose the phosphoric acid to retain but 2 units of lime and to form a softer, less consistent solid. And the cartilages of the ribs must be still more supple and elastic, so that in them the phosphoric acid may be supposed to be combined with but one unit of base, as the uncrystalline gelatinous metaphosphate.* On the other hand its teeth must be harder than its hardest bones, and a new demand is made on lime-phosphates to associate themselves with other lime salts (especially fluoride of calcium) to form the cutting edges and grinding faces of the incisors and molars. All the while also, the blood must be kept alkaline, that oxidation of the tissues may be promoted, and albumen retained in solution; and yet it must not be too alkaline, or tissues and albumen will both be destroyed, and the carbonic acid developed at the systemic capillaries will not be exchanged for oxygen, when the blood is exposed to that gas at the lungs. So, phosphoric acid provides a salt containing 2 units of soda and 1 of water which is sufficiently alkaline to promote oxidation, dissolve albumen, and absorb carbonic acid, and yet holds the latter so loosely, that it instantly exchanges it for oxygen, when it encounters that gas in the pulmonary capillaries. Again; the flesh-juice must be kept acid (perhaps as has been suggested, in electro-polar opposition to the alkalinity of

* Fleitmann and Henneberg's phosphates, intermediate between the monobasic and bibasic classes, and Maddrell's peculiar double metaphosphates, are described and commented on by Mr. Graham in his *Elements of Chemistry*, vol. i. 2d. ed. pp. 448, 449.

* "Von Bibra has made the beautiful observation that those bones which are the most exposed to mechanical influences contain the largest quantity of earthly constituents, (chiefly phosphate of lime.) The action of this law is manifested even in different families of the same class of animals; thus, for instance, in the rasores or scraping birds, the femur contains the largest quantity of phosphate of lime, in the grallatores or waders, the tibia, and in all other birds the humerus."—Lehmann's *Physiological Chemistry*. Cav. Soc. Trans. vol. i. 414.

The phosphate of lime in bones was represented by Berzelius at 8 Ca O, 3 PO^5; but according to Heintz and Rose it has the composition given previously in the text, 3 Ca O, PO^5. In reality, however, neither of these formulæ will always apply to bones although the latter probably represents the condition of the greater part of their lime phosphate. From my own results, and those of others in the course of agricultural analysis of bone earth, I cannot avoid inferring that several phosphates of lime exist in bones, although in the ash of the latter the nature of these salts as they occurred in the living organism cannot be ascertained. I have felt at liberty accordingly to assume as possible the phosphates, referred to in the text as existing in the child's skull and ribs.

the blood, as affecting the transmission of the electrical currents which are now known to traverse the tissues), and phosphoric acid provides a salt containing 2 units of water and one of potash, which secures the requisite acidity. Further: in some of the serous and other liquids of the body, a changeable salt is required; and for this phosphoric acid provides, by combining with soda, ammonia, and water to produce microcosmic salt which is alkaline in its integrity, but by parting with the easily lost, volatile ammonia becomes alkaline.*

All those compounds are needed in the adult as well as in the infant organism. With the adult we may further connect such an incident as the fracture of a bone, which is repaired by a beautiful process of splicing, during which phosphates, first very soluble, then moderately so, then slightly so, are finally succeeded by dense insoluble bone-earth, filling up the breach till it becomes the strongest part of the reunited bone. And as counterpart of this, we have the most solid bone dissolving under the pressure of a throbbing (aneurismal) blood-vessel, which unless the bone gave way would first torture, and then kill the whole body. Particle by particle, the petrified ivory is pressed, softened, melted, dissolved, and washed away by the same potent acid which hardened it from a thin liquid into a compact solid.

At all periods, moreover, in the life of the body, the liquid albumen and fibrin of the blood are becoming solid albumen and fibrin in the tissues. Both are also becoming, in the nursing mother, the casein of her milk, and that casein in her suckling's body is becoming the albumen and fibrin of its flesh and blood, and building up its organs in other ways.

Each of these blood-forming, flesh-forming, milk-forming, tissue-forming bodies, albumen, fibrin and casein, and likewise their analogue gelatine, are inseparably accompanied in all their liquefactions, solidifications, and transmutations by phosphates, which in virtue of their mobility, are able to liquefy, solidify, and undergo transmutation as the body which they accompany does. We cannot pretend to follow those changes step by step, for they occur within the inaccessible penetralia of a living structure; but certain it is that the phosphates accommodate themselves to changes which no other salts we know could submit to.

In the particular cases given above, there may be great misapprehension and even signal error. But in the general estimate of the organismal suitableness of phosphates beyond all other salts, there cannot be much mistake. Chemical unions have been compared to marriages, and chemical compounds to wedded pairs. If the comparison is accepted, then the great majority of the mineral acids are monogamists and wedded each to a single base; but phosphoric acid, like an Eastern patriarch, has the privilege if he pleases of wedding three bases, although he is often satisfied with two, and can cheerfully content himself with one. Or, to vary the figure more expressively, the ordinary acids are like the Hindoos under the domination of caste, and when hired as servants stipulate to carry but one thing, and the minimum weight of that. Phosphoric acid is an English servant of all work, lifting three loads at a time, of any three things that require to be lifted, and willing at all times to make himself generally useful.

Putting all figure aside, we may affirm that no acid is known to us, approaching to phosphoric acid in susceptibility of various modification. Even if we were to suppose, that as a hermit crab tries shell after shell till he finds one to fit him, the living organism had made trial in turn of all the mineral acids, we cannot imagine it finally selecting any one but phosphoric acid.

For a knowledge of its remarkable properties we are chiefly indebted to Professor Graham, who was the first also to suggest that its manifold variability specially qualified it for being what I may term the organismal acid *par excellence*. "Phosphoric acid," he observes, "is one of the links by which mineral and organic compounds are connected. And it may be reasonably supposed that it is that pliancy of constitution which peculiarly adapts the phosphoric above all other mineral acids to the wants of the animal economy."* He also illustrates this remarkable "pliancy" by the conversion which the hydrated metaphosphate of soda (Na O, PO^5 x HO) undergoes at 300° F. into the pyrophosphate of soda and water (Na O,

* Lehmann's *Physiol. Chem.* Cav. Soc. Trans. vol. i. 369.

* *Elements of Chemistry*, 2d edition, vol. i. p. 451.

HO, x PO^5), remarking that its conversion "exhibits a change of nature, without a change of composition, such as often occurs in organic compounds, but rarely admits of so satisfactory an explanation."*

I would add that the occurrence in plants of *organic* acids which are polybasic, such as tartaric, citric, meconic, and even as it would seem, oxalic acid, points to the organismal importance of polybasic acids throughout the living kingdom, and suggests the probability of organic acids of the same character occurring in animals, which our present methods of analysis do not enable us to reach. The acids of plants have not the pliancy of phosphoric acid, but seem generally as tartaric acid (which is *only* bibasic, like pyrophosphoric acid) to be permanently non-monobasic *in one degree*, but this lesser pliancy is in accordance with the simpler chemical changes of vegetable organisms, nor is the power of their organic acids small. Tartaric acid is much more potent than pyrophosphoric acid, and can transfer at once two such powerful and related bases as potash and soda, in the form of Rochelle salt, into plants. Its whole series of two-based salts is a remarkable one. Oxalic acid forms not a less varied class of so-called super-salts; and those of citric acid are many and singular also. It would seem that a monobasic acid is too narrowly endowed and one-sided to suit the constantly varying exigencies of a plant.

Among the lower animals, as phosphoric acid disappears from their skeletons, carbonic acid takes its place, but, as we see in the shells of molluscous animals, consisting largely of carbonate of lime, with the production of a substance admitting of no such varied interstitial changes, as occur in phosphatic skeletons. Yet carbonic acid is a much more pliant acid than many, and has good, if not indisputable claims to be counted bibasic: at all events it forms many double salts.†

And even in the lowest animals, where silica replaces alike phosphate and carbonate of lime, serving alone to constitute their skeletons, and hard appendages, we encounter a substance which is innoccuous, soluble in water, forming very peculiar hydrates, and susceptible of a gelatinous, an amorphous, and a crystalline modification. It has thus the conjoined mobility and stability which seem so essential to organismal ingredients. Further: it has an almost unique power of uniting at the same time with many bases, as we see in the silicates of the mineral kingdom, in glass and in porcelain; and this property may be turned to account in furnishing sponges and others of the lower organisms with the bases which contribute to their growth;* as these bases conversely may be the media through which silica enters the organism.

Such are some of the reasons which may be given in explanation of the presence of phosphorus, and especially of phosphoric acid, in the bodies of the higher animals, and in that of man. The subject has been considered purely from a chemist's point of view, without reference to any particular theory of life, or hypothesis regarding the existence or sphere of a special vital force. But nothing is further from my intention than to imply that such a knowledge of the properties of the chemical elements as we can acquire in a laboratory, is sufficient to explain their function as organismal ingredients. It is but one of the data essential to the solution of a most difficult problem; but it is a most important datum, and to the extent that the phenomena referred to in the preceding pages are unquestionable physical truths, they must receive full recognition in every coherent theory of life.

It remains to discuss, from the same point of view, but much more briefly, nitrogen and iron as organismal elements.

Nitrogen, or as it is otherwise called azote,

* Op. Cit. p. 447. Lehmann has fully appreciated these conclusions, although he hesitates to adopt them, observing that "it is almost self-evident that no salts of any other acid could be so usefully applied in the metamorphosis of tissue, as those of phosphoric acid, etc." (*Physiological Chemistry.* Cav. Soc. Trans. vol. i. p. 440). His work appeared in English in 1851, when I first became acquainted with it. The statements in the text regarding phosphoric acid, I have in greater part taught publicly in Edinburgh since 1840.

† Similar claims are advanced for sulphuric acid and cannot be disallowed; but it certainly is far less feebly bibasic than tartaric or pyrophosphoric acid, even though a sulphate of soda and potash can be formed; and the acid bisulphate of potash is as incompatible with animal organisms as slightly diluted oil of vitriol.

* Since reaching this conclusion, I find that Mr. Graham without reference to organic structures has suggested "that silicic, like phosphoric acid, forms several classes of salts."—(*Elements of Chemistry*, second edition, vol. i. p. 395.). This view was not contemplated in the text, but would as well as that proposed, provide for the transmission of bases and silica to silicious organisms.

which stands at the greatest distance from phosphorus in the group which includes both, is like its analogue, at once very fixed and very variable in properties, but in a way peculiar to itself. Its free or uncombined state is its stable condition. So far as we know, it has no allotropic modifications. In the one shape, that of a permanent elastic fluid, in which it presents itself, it is astonishingly inert. Without taste, odor, or color, incombustible at ordinary temperatures, and not supporting combustion, very slightly soluble in all liquids, free from acidity and alkalinity, and not poisonous, it occupies the same neutral or negative place among gases that water does among liquids. It unites directly with no other element at common temperatures, and with but one or two at higher ones. This indifference to direct combination is closely associated with its great elasticity as a gas. It is probably, indeed, the body which presents the best example of gaseïty or gaseous elasticity. The only bodies which can compare with it in this respect are oxygen and hydrogen, which, like it, have never been liquefied. But oxygen is much more soluble than nitrogen in water and other liquids, and directly unites with many bodies, so as to form solid as well as liquid compounds, from which it is with difficulty set free, and reconverted into an elastic fluid.

It does not appear that hydrogen is more soluble in liquids than nitrogen; but it unites directly with many bodies, and forms both liquid and solid compounds which are stable and enduring, so that it is mediately much more liquefiable and solidifiable than nitrogen.

This pre-eminent elasticity as a gas peculiarly qualifies it to serve the animal organism in its performance of the great function of respiration. Indifferent to all other elements, it dilutes oxygen to a point compatible with its effecting the needful slow combustion of the body, which, if undiluted, it would rapidly burn away,. Gaseous nitrogen thus goes the round of the circulation, taking no part in the changes to which the blood ministers, and after making the "grand tour" as a seemingly unobservant traveller, returns to the lungs and the atmosphere exactly as it left them.*

But though free nitrogen will scarcely unite with a single other free element, by indirect processes it can be made to unite with nearly all the elements; and the compouuds which it forms are among the most remarkable which the chemist knows; acids the most potent, such as nitric acid; alkalies the most powerful, of which ammonia is one among a multitude; dyes the most useful, such as indigo; medicines the most energetic, such as quinine; poisons the most deadly, such as prussic acid and strychnia; besides endless other substances, belonging to every category of chemical compounds.

To the nitrogenous bodies as a class, belongs as a distinctive property the utmost readiness to undergo change, and exactly because they contain an element indifferent to change. Its great gaseous elasticity prevents it from entering into combination, and its great tendency to recover the gaseous form causes it readily to abandon its compounds. As Gmelin expresses it, "Nitrogen has probably the greatest affinity of all ponderable bodies for heat, with which it constantly tends to form a gas. Consequently, many of its compounds are decomposed by slight causes, with extreme suddenness, the nitrogen being disengaged in the gaseous form, and often producing the most violent explosions."*

One mode in which the characteristic longing of nitrogen for freedom displays itself, is as Gmelin implies, by conferring explosiveness on its compounds. I need only name gunpowder; the various bodies of which gun-cotton is the type; percussion-cap powder and other fulminates; the so-called ammoniuret of gold; and the chloride and iodide of nitrogen.

In a greatly lessened degree, this chemical fragility and instability are conferred by nitrogen upon the compounds which it forms within living organisms. The immensely

* Nitrogen is not of less service to organisms as the chief constituent in weight and bulk of the atmosphere, inasmuch as it diminishes the rapidity of combustion and oxidation at the earth's surface; whilst as a great gaseous envelope which the ocean and tributary waters cannot dissolve and which neither acts injuriously on rocks, plants, or animals, nor is altered in quality by them, it forms a permanent medium for the production of winds, and a moderator and equaliser of the sidereal light, heat, and other agencies determining climatic differences, such as no other gas, simple or compound, known to us, could be. But however important such services are to the entire vegetable and animal world, they are rendered outside of the organism, and cannot be added to the list of good qualities which belong to nitrogen as an organismal element.

* *Handbook of Chemistry.* Cav. Soc. Trans., vol. ii. p. 373.

greater and more numerous chemical changes which characterize animals than plants, are essentially connected with the much greater abundance of nitrogen in the former. The difference between the slightly alterable, slowly combustible vegetable cotton, a compound of carbon, hydrogen, and oxygen, and the spontaneously decomposable, explosive gun-cotton, which differs from it in quality of ingredients by the addition of nitrogen, is typical of the distinction between the enduring, non-nitrogenous, vegetable compounds, and the spontaneously changeable nitrogenous animal compounds; although in this particular case the increase of oxygen in the gun-cotton, exaggerates the instability to the point of explosiveness.

The fibrin, albumen, casein, and gelatine which form the largest part of the muscles, the brain, the nerves, and the soft portion of the bones, as well as of the non-aqueous part of blood, milk, and the other animal fluids, contain much nitrogen, and in the revolution of the circulation this gas is unceasingly availing itself of its power to become free, to change those bodies in a multitude of ways. At all the glands, nitrogenous compounds are present, taking active part in those mysterious processes by which the blood is filtered, transmuted, recreated, and vitalised into bodies unlike itself. During the germination of seeds we can trace the beginning of the process as a cycle of chemical changes, to the action of oxygen on nitrogenous substances which begin at once to change, and soon involve all the non-nitrogenous compounds in change also. During the fermentation and putrefaction of vegetable and animal substances, we find in like manner the alteration beginning with a nitrogenous compound, which, though present in minute quantity, commences an intestine disturbance destined to proceed till everything is altered. Leaven is one of the nitrogenous bodies, and it is sacredly proverbial that a little leaven leavens the whole lump. The curdling of milk by rennet is a similar phenomenon; so also is digestion in its first stage (which we can imitate artificially) as it occurs in the stomach. The morbific matters which develope diseases such as small-pox, are, so far as our limited knowledge goes, nitrogenous compounds, and we have reason to believe that their action in propagating disease, resembles that of the yeast-ised body. diastase (a modification of albumen) in the germination of seeds, and of the albuminous yeast in fermenting sugar. The healthy phenomena of secretion seem to be in many respects similar in character; a readily changeable nitrogenous compound in the process of change, fermenting, as it were, the blood into milk, tears, saliva, or the like.

It is not to be denied that we are quite unable to explain why the fact of a nitrogenous body, undergoing decomposition in the neighborhood of another and it may be non-nitrogenous body, should cause that other to decompose, although it gives nothing to it and takes nothing from it: why for example sugar, a compound of carbon, hydrogen and oxygen, should change into alcohol and carbonic acid, because vegetable albumen or yeast is changing side by side with it, into substances totally different. But we know that the sugar if alone would *not* change, and that the albumen though alone *would* change, and that when both are placed together the change always *begins* with the albumen. Hence whatever obscurities remain, we are certain of the great changeableness of the nitrogen compounds, and of their power to involve other compounds in great changes also. It is thus that the mobility of nitrogen makes it pre-eminently the modifier of the living organism. Like a half-reclaimed gipsy from the wilds, it is ever seeking to be free again, and not content with its own freedom, is ever tempting others, not of gipsy blood, to escape from thraldom. Like a bird of strong beak and broad wing, whose proper place is the sky, it opens the door of its aviary, and rouses and flutters the other and more peaceful birds, till they fly with it, although they soon part company.

Of all the elements it is at first the least attractive to the chemist; but in the end no one rivets his attention more. His early indifference to it is a tribute to its stability; his lasting esteem for it is a tribute to its mobility. Its twofold character is the measure of its organismal importance.

The elements hitherto considered are all non-metallic, but this sketch would be blameably imperfect if no organismal metal were referred to. And among the organismal metals, iron is *par excellence* the metal, as certainly as it is, by the testimony of ages, industrially the most excellent of them all. All countries have honored the smith, and he would wonder more than he does at his own

skill, if he realised that the iron which he hammers, is hammered not merely by iron in his hand, but also by iron in his blood. Yet the function of this iron is so little known, that, though statistical men have calculated how many railroads might be made out of the blood-iron of a generation of mankind, the most acute and accomplished chemists tell us, to take the words of one, that "we are unfortunately perfectly ignorant regarding the special uses of iron in the animal economy." * And I have to turn to a poet to find a reason why it is so useful. Alfred Tennyson, in his Princess, makes the father of his heroine exclaim, when his stately daughter shows no signs of relenting towards the wounded prince,—

"I 've heard that there is iron in the blood,
And I believe it."

Old King Gama's final cause for iron in the blood was to secure "a steel temper" for those in whose veins it ran largely. He would have promised the chemist a large percentage of ferric oxide from the blood of the Great Captain, whom his countrymen loved to call the Iron Duke. This is the only final cause I remember to have seen assigned for blood being chalybeate. Perhaps the fine satire of the poet may quicken us to discover others.

Iron is intermediate in properties between the very oxidable metals, such as potassium, and the very unoxidable metals, such as gold. The former yields compounds too fixed, the latter compounds too variable, for the necessities of the living organism with its nicely-balanced affinities, and its stable-unstable equilibrium. Far from either extreme, iron belongs to a group including aluminium, chromium, manganese, nickel, and cobalt; but it differs from them all, and conjoins fixity and variability to an extent which none of them do.

Iron as a metal is readily crystallisable; oxidable at ordinary temperatures even in mass; peculiarly susceptible of magnetisation; fusible only at a very high temperature; agglutinating so as to admit of welding occurring at a somewhat lower heat; and possessed at the same, and at higher temperatures, of a peculiar affinity for carbon. It is further remarkable as admitting of a singular passive as well as an active electrical condition. Iron forms three important compounds with oxygen, besides a fourth (ferric acid) not requiring notice. The first, or protoxide, which consists of 1 unit of metal to 1 of oxygen is a powerful base. The third, or peroxide, which consists of 1 unit of metal to 1½ of oxygen, is a weak base, and cannot unite with carbonic acid. The second, which as compared with the first and third is intermediate in composition and also in properties, especially so far as basic power is concerned, is strikingly characterized by being magnetic, and is called in consequence the magnetic oxide. Through these three stages of oxidation, iron can rapidly pass backwards and forwards, altering its basic and magnetic powers as it changes. As peroxide it has a remarkable attraction for organic matter, familiarly exemplified by the difficulty experienced in removing iron-stains from linen, and turned to excellent account by the dyer and calico-printer. This property does not belong to the protoxide, but all the oxides of iron resist precipitation from their salts by alkalies when organic substances like sugar are present, in consequence, apparently, of combining with them.

With the great majority of the non-metallic elements iron forms compounds similar to those which it forms with oxygen. Among these are the remarkable combinations with carbon, which confer upon cast-iron and steel their valuable properties, and the curiously complex radicals with carbon and nitrogen (ferrocyanogen and ferridcyanogen), which occur, for example, in prussian blue, where iron in part acts as a metal, in part acts as a non-metal, as if it replaced both the sodium and the chlorine of common salt.

In virtue of those properties iron can accommodate itself as few metals can, to the metamorphoses of the organism. In the arterial blood full of oxygen it can become a peroxide, cleaving like a dyer's mordant to the organic matter of the corpuscles or blood-cells. In the venous blood, containing little oxygen, it can become protoxide, perhaps combining, as has been suggested, with carbonic acid. At both sets of the capillaries, it may at the crisis of change of the blood from venous to arterial, and from arterial to venous, transiently become the intermediate magnetic oxide. In one or other of those forms, or in similarly variable states of combination with other elements than oxygen, it can enter into

* Lehmann's *Physiological Chemistry*. Cav. Soc. Trans. vol. i. p. 443.

the composition of the various solids and fluids of the body in which it is found occurring, and perform, as it does even in the inorganic ferrocyanides, exactly opposite functions in neighboring portions of the same tissue. At the same time, its combinations are far removed from the category of fragile chemical compounds; even those with organic substances, such as the dye-mordants, resisting the decomposing action of powerful acids and alkalies.

Now, let the characters of iron which have been noted be regarded simply as exponents of a conjoined mobility and stability, without attaching any value to the particular modes in which those characters are supposed above to be organismally serviceable, and let us see how far the metals most resembling iron agree with it in such properties as the dominant metal of the body must possess. Chromium has a basic peroxide and a strongly acid, extremely unstable, higher oxide (chromic acid), but no protoxide or intermediate oxide. Practically it could occur in the body only as the basic oxide, a substance having few affinities, for chromic acid is rapidly destroyed by organic substances and reacts destructively on them, so that it is not surprising that its salts are poisonous.

Aluminium forms only a peroxide, alumina, so that it is an unpliant, unaccommodating metal. Alumina, moreover, (the dyer's most useful mordant), has so excessive an attraction for organic matter, with which it forms insoluble compounds, that it cannot take an active part in organismal changes. In truth, when taken internally, it is prevented by this precipitation in an insoluble form along with the first organic substance which it encounters, from entering the blood except in minute quantity, and it is not retained there.* If, indeed, there is any justice in the statement that bakers are in the habitual practice of adding alum to bread, we must be continually swallowing alumina, yet none is found in our blood.

Manganese as a metal is the very reverse of aluminium, and too variable for the wants of the living economy. It resembles iron, but has a wider range of affinities, and it is very feebly magnetic. It oxidizes so rapidly in air, that it can only be preserved in sealed tubes, or under liquids containing no oxygen.

* Lehmann's *Physiol. Chem.* Cav. Soc. Trans., vol. i. p. 449.

In accordance with this oxidability, it forms four non-acid oxides, three corresponding to those of iron, but the fourth, or black oxide, having no analogue among the iron-compounds; and two acid oxides, one manganic acid, corresponding to ferric acid, and like it very unstable, the other permanganic acid, also, though in a less degree, an unstable compound. This susceptibility of oxidation in various degrees, which, moreover, implies a power of uniting variously with other bodies than oxygen, appears to unfit manganese for taking a prominent part as an organismal metal. It does occur in minute quantity in the animal body along with iron, as if to supplement it, but it is more abundant in the spent tissues than in any of the fluids that take part in the vital functions.* It appears indeed to be hurried out of the system in virtue of the great mobility of its compounds.

The two metals which most resemble iron are cobalt and nickel. They produce oxides similar to those of iron, and are strongly magnetic. Their affinity for oxygen, however, is less than that of iron, for they remain untarnished where iron rusts. They also dissolve more slowly than it in dilute acids. Their higher oxides are not basic. Their peroxides have not the stability of the peroxide of iron, nor, so far as appears, do they possess the attraction for organic matter which belongs to that body; neither do they form a sharply defined intermediate oxide, like the magnetic oxide of iron. They would not then, if substituted for iron in the living organism, equal it in power, nor do their properties appear to suit the wants of the body better, or indeed so well as those of iron do. Yet they resemble iron so much that we can well suppose conditions of the system, in which they might be serviceable, and my colleague in the University, Professor Simpson, has long been in the practice of administering salts of nickel in those diseases which are accompanied by a deficiency of red globules in the blood. In such cases iron is generally administered, and often with marked utility, but sometimes it is of no service, and then nickel is often beneficial. Dr. Simpson called my attention to this fact more than two years ago, simply as an experiential result, and not as reached through any such theory as that followed above. The fact is on this account the more interesting

* *Op. Cit.*, p. 448.

to me, and my colleague's anticipation that the blood, if rigidly analyzed, will be found always to contain nickel, may be confirmed; although, on the other hand, it is quite possible that there may be abnormal conditions of the system, where a metal of the iron-group may be more useful than iron itself, not to the extent of its similarity, but of its dissimilarity to that metal; as manganese for example, where the metamorphosis of tissues is too slow; aluminium where it is too swift. It may be thus that nickel, as well as cobalt, proves serviceable as a tonic; and in that case we should not expect to find them among the normal ingredients of the blood.

Iron then is a unique metal. We could replace it by no other without a sacrifice of properties which are serviceable to the higher organisms. More than this it might be unreasonable to affirm. But there is one feature of its uniqueness which is worth a moment's further consideration. Except nickel and cobalt, it is the only decidedly magnetic metal, and it is more magnetic than they. It must influence the body in virtue of its magnetism in a way no non-magnetic metal could, and its magnetic condition must be continually altering. The patients of Reichenbach may sometimes have deceived themselves, or him, or both, when they declared that their sensations were different, according as they lay along or across the magnetic meridian; but it is certain that the iron in our bodies must be in a different magnetic condition in the opposite positions, and it is reasonable to suppose that some persons may be sensitive enough to appreciate the difference. At all events, the observations of Faraday on the magnetic condition of flesh and of living animals, demonstrate that the organismal iron is magnetically active. We know also that magnetism cannot be developed without a simultaneous development of electricity, so that magnetic changes in the ferruginous blood and flesh must be accompanied by electrical changes. Electricity also invariably develops magnetism, and we know that electrical currents are constantly traversing the muscles and other organs. Such currents will react on the magnetic masses in their neighborhood and be reacted on by them, with a corresponding exaltation of the intensity alike of the electricity and the magnetism.

Further, the peculiar force or polarity which acts along the nerves resembles in many respects electrical and magnetic force. It is probable that all three forces or polarities powerfully influence each other, and that the magnetisable iron of the body is continually taking part in such reciprocal actions. If, moreover, the iron in the blood-vessels, as has been suggested previously, becomes magnetic oxide at each half-revolution of the blood, it will be much more magnetic at each of the great crises of the circulation than at any other period. I feel at least assured that the magnetic qualities of iron are among its organismal virtues, and that Copper, for example, however suitable otherwise, could never perfectly replace iron, inasmuch as it is devoid of all but traces of magnetic power.

Such is an endeavor, most imperfect and inadequate, to exemplify one mode in which we may hope to discover why living creatures consist of certain chemical substances rather than of others. I ask for an indulgent estimate of a method of research in which I have scarcely a predecessor; but I submit to criticism examples of the method, because I believe it to be logically free from objection. It only assumes that whatever properties a chemical element possesses before its entrance into an organism, it retains after its entrance. Thus, if iron be crystallizable, magnetizable, electrifiable, oxidable in various degrees, and ready to unite with organic matters out of the body, I assume that it will continue to exhibit those properties within it, whatever may be the additional properties which it manifests in virtue of its being placed in such new conditions as can be realized only in a living organism. When we examine substances in a perfectly dark apartment we discern no color in them, but when we carry them with us into a lighted room, and perceive the tints which they then display, we do not doubt that they retain all the properties which they exhibited in darkness; and that these moreover are closely connected with their assumption of color when light falls upon them. We make a similar but not less legitimate assumption, when we take for granted that all the properties which exist in an element when part of a dead mass, remain in it when part of a living one. Such a mode of inquiry, accordingly as I have suggested, may be prosecuted equally well under the guidance of almost any hypothesis, or theory of life, or without hypothesis or theory at

all. And it cannot fail to yield important results.

The careful study of each of the chemical elements with a view to ascertain why it is suitable or unsuitable to become a component of a living organism, may often enable us to anticipate physiological discoveries; as conversely the careful study of the molecular changes which occur in living organisms, may enable us to anticipate chemical discoveries in reference to inorganic bodies.

It has always seemed to me very remarkable that the sciences which are mutually dependent, should so rarely be found furnishing each other with principles which can be used *deductively* as organons of discovery. The chemist, for example, might have said to the physiologist, I find, from my experiments on phosphoric acid and its salts, that it is so unique in its conjoined mobility, stability, and manifold mutability, that I predict you will find it largely present in organisms, and taking an active part in their most characteristic metamorphoses. Or the physiologist might have said to the chemist, I find this phosphoric acid so universally present in the organs of the living body, assisting in functions so different, and accommodating itself to changes of condition so great, that I am certain if you examine its inorganic compounds, you will find them unlike those of any other acid, much more numerous, and very dissimilar to each other.

To take another example. The fact of but one set of tubes being provided in our bodies to convey air *to* the lungs and *from* the lungs, and the fact that gases, irrespective of chemical affinity and of difference in relative density, rapidly intermingle and exchange place, stand in direct connection with each other. The natural philosopher might have said to the physiologist, I find that a peculiar diffusive force comes into play when unlike gases meet each other, so that in a way liquids cannot do, they exchange places with great rapidity, and pass in opposite directions along the narrowest tube. I predict, accordingly, that though one set of vessels may be provided to carry blood to the lungs, and another to carry blood from them, a single set of tubes will be found all that is provided to carry air to and from those organs, and one channel will prove to be sufficient for inspiration and expiration. Or the physiologist might have said to the physicist, I find living organisms inspiring and expiring through a single canal, which, moreover, in many of them is a tube with rigid walls: there must, therefore, be an unsuspected power of intermingling, and exchanging places on the part of gases, which, if you seek for, you will certainly find. The physiological and the physical fact, however, were discovered independently.

Occasionally we have seen one science assist another in the way suggested. Thus the optician, especially after the invention of the telescope and of spectacles, pressed upon the attention of the physiologist that the living eye must possess the power of adjusting its focus to the vision of objects at different distances. And after some two centuries of unsuccessful endeavors to solve the problem, but not without the discovery of many important truths, in their efforts at its solution, the physiologists of our own day have within the last three years justified the optician by solving the problem, and have added largely to the wealth of their own science.

If there are few such cases, it only shows how much more difficult it is to reason deductively than inductively, and how very rarely man can look down from a point of view, even faintly approximating to that at all times occupied by God, and see a law go forth to its fulfilment.

And therefore before seeking to reach the last conclusion to which our method of inquiry may lead us, I would pause to notice the lesson which it teaches of humility and patience. Kepler, the astronomer, when he could not convince his contemporaries that the laws which he had announced as presiding over the movements of the heavenly bodies did actually exist, nobly consoled himself with the reflection that if God had waited some six thousand years before he could find one man to believe that He had impressed such laws on the planets, Kepler might well wait one year before blaming his fellow men for not believing him. If God, in like manner, has waited not thousands, but millions of years, before a very few of his children have studied his works, so as to learn, even most imperfectly, why he made them and their Pre-Adamic ancestors of one kind of dust, rather than of another, we need not boast of the little we know, or angrily complain, because our small discoveries about fluorine, or

the like, do not seem to others quite so wonderful as they do to ourselves.

With no desire, accordingly, to be dogmatic, or to press for a verdict in favor of my conclusions, I refer to the truths (in so far as they are truths) expounded in the preceding pages as *illustrations*, not *demonstrations* of final causes. To a belief in these no man can compel another, and I would not compel another even if I could. I blame no man for disbelieving them; but I should be glad to secure for all, the happiness which faith in them begets. The doctrine of final causes is at present in disrepute in many scientific quarters, and this can neither be wondered at, nor in many cases much condemned. There have been so many unwise endeavors to sustain this doctrine, by arguments of less than no value, that it has been unavoidably discredited and despised.

All lovers of truth will join in protesting against making a search for final causes, the chief object of scientific inquiry. We are certain to be misled if we do. There are idols of the church, as dangerous as those idols of the den or of the market-place against which Bacon so specially warns us. But when guided by the *Lumen Siccum*, which a desire for the simple truth supplies, we have patiently and honestly reached a result, and then find our hearts swelling with rapture at the wondrous example which it affords of God's wisdom and power, we are traitors to ourselves and to our Maker if we refuse adoration.

I believe that few honest intellects and hearts can come face to face with such truths as I have most imperfectly detailed in these pages, without in the beginning feeling a great doubt of their reality, and in the end a great faith in them; and I know that, like St. Thomas of old, they will first stand up, and thrust their fingers into the nail-marks on the palms, and their hands into the hole in the side; but by and by they will kneel and say "My Lord and my God!" If some are faithless, I will ask them to look at the Great Panorama with beating hearts, as well as with eager eyes, and I will simply sorrow for them if they think to measure the universe by the intellect and the senses. I follow with unbounded delight and gratitude, though it is at a long distance, the footsteps of the great Philosopher Humboldt, when he goes before me round the vast Cosmos, and with infant-like simplicity shows me every known feature of universal nature, without speculation on its purpose or cause. But I have no sympathy with the Man Humboldt when he tells me that our most reverent demeanor towards God, is that of not pretending to discover purposes of one kind or another in any of his works; so that we should imitate the Ancient Egyptians who showed their special reverence for Osiris by never naming him. The only attitude that befits us as men, after traversing a mere fraction of the Cosmos, is that of kneeling worshippers.

Nor need we be ashamed to be seen on our bended knees, because Final Causes are so often foolishly dealt with by their admirers. They always will be by a large class. Few realize what the words Final Cause mean. To demonstrate the full reason or entire Final Cause, why one element, such as iron, exists in the body, would demand a perfect acquaintance, not only with all the properties of that element, but with all those of every other element which is also present in the body; besides an acquaintance wi h much else: and how little do all the chemists of the world know even of a single element?

The sagacious old alchemist, Basil Valentine, in his famous *Currus Triumphalis Antimonii*, in which he has triumphantly ridden down to the present day, and is likely to ride for many a day to come, declares that "no man knows all the virtues of Antimony."* With what astonishment would Basil, if he could revisit the earth for half an hour, hear of antimonious, antimonic, and metantimonic acids; of antimoniuretted hydrogen, pentasulphide of antimony, stibio-methyle, stibio-ethyle, and the like. The coaches of his day did not differ more from the railway carriages of ours, than his "Currus Triumphalis," does from such a Triumphal Chariot of Antimony, as Hofmann, if he chose, could mount upon literary wheels at the present day. Yet Hofmann would find no better

* Basil's own words, as given in the quaint translation printed in London for Dorman Newman at the King's Arms in the Poultry, 1678, run thus:—"*Antimony*, like unto *Mercury*, may fitly be compared to a round circle, of which there is no end; in which the more diligently a man seeks, the more he finds, if process be made by him in a right way and due order. *Yet the life of no man is sufficient for him to learn all the mysteries thereof.*"—Basil Valentine, *his triumphant Chariot of Antimony, with Annotations of Theodore Kirkringius, M.D.*, p. 19.

motto to put upon the panel of his chariot than Basil's words, "No man knows all the virtues of Antimony," and I may add, no man ever will; nor is the chemist better off in respect to other things than he is in respect to Valentine's favorite metal.

What we call a final cause, is not God's final cause, but only that small corner of it which we can comprehend in our widest glance. The fragmentary corner fills our intellects, not because it is vast, but because they are small, and we find how small they have made it, the moment we try to make the fragment a measure of infinite wisdom. The wisest of us is but a microscopic shell in the ocean of Omniscience, and when left on the shore with a drop of its waters in our cup, we cannot reflect in its tiny mirror more than a drop's worth of the meaning of the universe. And yet we speak as if out of that drop the whole universe might arise! Men of cold, logical intellect have so fully realised this, that on all hands they remind students of science that Bacon declared final causes to be sterile, comparing them to nuns or vestal virgins dedicated to God.*

I accept Bacon's statement, and still more his comparison. He is held by most who quote his famous condemnation of Final Causes to have pronounced them *essentially* unfruitful; but if he did not intend simply to signify that they are unfruitful *to man*, he could not have chosen a comparison better fitted to signify an unfruitfulness which was of extrinsic, not intrinsic origin.

Final Causes are sterile, not merely like as, but for the same reason as, the Vestal Virgins were, namely, because they belong to God. These virgins, as well as others, might have become mothers; but no man dare wed them, for they were God's Brides. Neither can any man mate with Final Causes: they will bear no offspring to him. And exactly for that reason are they the most perfect of earthly witnesses to the being and perfections of God. Gentle, solemn, and beautiful, they attract men, and modestly permit them to look on their features; but awe mingles with admiration in the gazer's heart, and the ever-burning fires on the vestal altar forbid all close or impious approach. Nevertheless, we must seek after, and love Final Causes, even with a lover's passion, although in this life they never can be ours. An irresistible impulse compels us to cling to them. It would be a proof of insanity if we were only mortals; as would also be that attempt to be omniscient, which is the constant, though often unconscious aim of every student. But both are the most natural and irrepressible instincts of immortals, who look forward, through God's mercy, to all eternity as their time of studentship, and to all His Infiniteness as the object of their study. For such the contemplation of Final Causes will never end, any more than it will ever beget satiety.

G. W.

* "Nam *Causarum Finalium* inquisitio sterilis est, et tanquam virgo Deo consecrata nihil parit." — *De Augmentis Scientiarum*, lib. iii. cap. v. Since writing the text, I find that in the elaborate edition of Bacon's works, of which the first volume has just issued from the press, under the editorship of Messrs. Spedding, Ellis, and Heath, this passage is commented on as follows:—"No saying of Bacon's has been more often quoted and misunderstood than this. Carrying out his division of the *Doctrina de Naturâ*, which, as we have seen, depends upon Aristotle's quadripartite classification of causes, he remarks, that to Physica corresponds Mechanica, and to Metaphysica, Magia. But Metaphysica contains two parts, the doctrine of forms and the doctrine of final causes. Bacon remarks that Magia corresponds to Metaphysica, inasmuch as the latter contains the doctrine of forms, that of final causes admitting from its nature of no practical applications. "Nihil parit," means simply, "non parit opera," which, though it would have been a more precise mode of expression, would have destroyed the appositeness of the illustration. No one who fairly considers the context can, I think, have any doubts as to the limitation with which the sentence in question is to be taken. But it is often the misfortune of a pointed saying to be quoted apart from any context, and, consequently, to be misunderstood."—P. 571.

Recollections of Mrs. Hester Taffetas, Court Milliner and Modiste during the Reign of King George the Third and his Consort, Queen Charlotte. Edited by her Granddaughter. (Knight & Son.)

THIS little book is a collection of anecdotes and family histories, which have all, more or less, the look of having their foundation in real facts. They are extremely well told, though occasionally there is a lack of simplicity, and more sentimental ornament than is desirable; but there is a freshness and reality about the stories which make them very pleasant reading,—and the thread on which they are strung is itself made interesting, the personality of the "Court Milliner" being well maintained throughout without being obtrusive. We should be glad to listen to some more of Mrs. Taffetas' gossipping.—*Athenæum.*

From The Times, 3 Sept.

ENGLAND'S SUMMER, 1857.

The echoes of the rage of war
Fade in the Eastern distance;
"Two years ago" looms very far
In our well-filled existence:
On that broad East, yet more remote,
We waste not thought or feeling,
But muse on British flags afloat,
And swarthy millions kneeling.

Week after week the summer sun,
Undimmed by cloud or shower,
With an Italian speed brings on
The happy harvest hour;
The arts of peace, by plenty nurst,
Proclaim the world's alliance,
Even in the merry trumpet burst,
And shouts of gay defiance.

Then flash along the sentient-wire
Some words so brief and fearful,
That they who hear them scarce desire
To see their children cheerful:
Tidings that through wide Hindostan,
Where British rule stood surest,
No life is safe of Christian man,
The loftiest or the poorest.

Is it a nation roused to meet
In arms a strange dominion?—
A people maddened by the heat
Of just or false opinion?
No; soldiers, cared for as our sons,
And clothed with England's honor,
Have turned their parricidal guns
With basest craft upon her!

Soon things that make young blood run cold
We whisper, while we tremble;
Or cry that truths shall not be told
We to ourselves dissemble;
And hideous images affright
Our soul's deep hiding-places,
And in our sleep we start at sight
Of unknown forms and faces.

Our fair expanse of green and gold
Can hardly find us grateful,
The very sun that could behold
Such scenes is almost hateful;
Warm rays flare up to cruel heat,—
We sicken and we languish,
With those on whose sad heads they beat
Intolerable anguish!

We mark, as comes the breeze of morn
To freshen and to sweeten
The ripples of the oaten corn,
The billows of the wheaten;
And feel that not one such sweet breath
Can reach where parch'd and tangled
The earth gives up to wasting death
Our brethren foully mangled.

And O! the pangs of those who know
What never must be spoken—
Hearts that will bear about the woe
Of memory until broken:
God give them thoughts of those who died
In Christendom's first ages,—
The child, the veteran, and the bride,—
The saints of history's pages!

For these are Christian martyrs too—
And England's all the dearer:
The mighty work she has to do
These agonies bring nearer;—
Conjuring her by that pure blood
No moment to abandon
The task of world-embracing good
She once has laid her hand on.

She cannot match the devilish deed,
Nor mate the hideous treason,—
Her blow is not the traitor's meed,
But self-defending reason:
That will be lavish of its life,
And hold all cost uncounted
Till through the length and breadth of strife
This peril be surmounted.

Then may she pardon—only then—
When shamed and conscience-stricken,
The credulous or slothful men
Who let the horror thicken—
Who little knew and nothing planned
The evil bond to sever,
Nor dared to burst it with the hand
Of resolute endeavor.

Yet whilst the rulers we condemn,
Who failed in due prevision,
We trust for Britain, as for them,
In history's great decision,—
That subject lands more justly ruled,
And strength more mildly wielded,
Had never been, than when befooled
To noble hopes we yielded;—

Hopes of a world the force of law,
The worth of knowledge prizing;—
From Heathendom's debasing awe
To Christian reverence rising;
Hopes of a people struggling forth
From custom's deep entrancement,
Led by the conquerors of the north
To Freedom's safe advancement.

Be this an Oriental tale
By Saxon pride engendered,—
Hopes for a hundred years may fail,
Yet not be all surrendered:
And now from each distracting scene
Of passion fiercely nourished,
We know what India might have been
Had Moslem tyrants flourished:

So would have been, and yet would be,
If England shrank from duty.
. . Then watch your harvest wealth with glee;
Rejoice in Nature's beauty,
Making her bounties ministers
Of toil and self-denial,
And Victory's surest harbingers,
After the fiery trial.

R. M. M.

CHAPTER XXXVI—"THE FRONT."

MAN has been variously defined by philosophers as a cooking animal (the truth of this definition, unless when applied to our Gallic neighbors, I stoutly contest), as a reasoning animal (this likewise will hardly hold water), as a self-clothing animal, as an omnivorous one, as an unfeathered biped, and as an improved specimen of the order of Simiæ without the tail! None of these definitions will I accept as expressing exactly the conditions and necessities of our species. I believe man to be an animal fed on excitement—the only one in creation that without that pabulum, in some shape or another, languishes, becomes torpid, and loses its noblest energies both of mind and body. Why do men drink, quarrel, gamble, and waste their substance in riotous living? Why does Satan, according to good Dr. Watts, always provide work "for idle hands to do?" Why, but because man *must* have excitement. If he have no safety-valve for his surplus energies in the labor which earns his daily bread, they will find vent through some other channel, either for good or evil, according to his bias one way or the other. There is no such thing as repose on the face of the earth; "push on—keep moving," such is the motto of humanity. If we are not making we must be marring, but we cannot sit still. How else do we account for the proverbial restlessness of the sailor when he has been a few weeks ashore? How else can we conceive it possible for a rational being, whilst enjoying the luxuries and liberty of a landsman's existence, to pine for the hardships, the restraint, the utter discomfort which every one must necessarily experience on board ship? How, except upon this principle, can we understand the charm of a soldier's life, the cheering influence of a campaign? It is most unnatural to like rigid discipline, short rations, constant anxiety, and unremitting toil. A wet greatcoat on the damp earth is a bad substitute for a four-post bed, with thick blankets, and clean sheets not innocent of the warming-pan. A tent is a miserable dwelling-place at the best of times, and is only just preferable to the canopy of heaven in very hot or very cold, or very windy or very wet weather. There is small amusement in spending the livelong night in sleepless watching for an enemy, and little satisfaction in being surprised by the same about an hour before dawn. It is annoying to be starved, it is irritating to be frightened, it is uncomfortable to be shot,—yet are all these casualties more or less incidental to the profession of arms; and still the recruiting sergeant flaunts his bunch of ribbons in every market town throughout merry England, and still the bumpkin takes the shilling, and sings in beery strains, "Huzza for the life of a soldier!"

And I too had tasted of the fierce excitement of strife—had drunk of the stimulating draught which, like some bitter tonic, creates a constant craving for more—had been taught by the influence of custom and companionship to loathe the quiet dreamy existence which was my normal state, and to long for the thrill of danger, the variety and unholy revelry of war.

So I returned with Ropsley to the Crimea. I had small difficulty in obtaining leave from Omar Pasha to resign, at least for a time, my appointment on his personal staff.

"They are queer fellows, my adopted countrymen," said his Highness, in his dry, humorous manner, and with his quaint smile, "and the sooner you get out of the way, friend Egerton, the better. I shall be asked all sorts of questions about you myself; and if you stay here, why, the nights are dark and the streets are narrow. Some fine morning it might be difficult to wake you, and nobody would be a bit the wiser. Our Turk has his peculiar notions about the laws of honor, and he cannot be made to comprehend why he should risk his own life in taking yours. Besides, he is ridiculously sensitive about his women, particularly with a Christian. Had you been a good Mussulman, now, Egerton, it could have been easily arranged. You might have bought the lady, got drunk on champagne with old Papoosh Pasha, and set up a harem of your own. Why don't you become a convert, as I did? The process is short, the faith simple, the practice satisfactory. Think it over, my good Interpreter, think it over. Bah! in ten minutes you would be as good a Mussulman as I am, and better." And his Highness laughed, and bid me "Good-bye," for he had a good deal upon his hands just then, being on the eve of marriage with his *fifth* wife, a young lady twelve years of age, daughter to his Imperial Majesty the Sultan, and bringing her husband a magnificent dowry of jewels,

gold, and horses, in addition to many broad and fertile acres in Anatolia, not to mention a beautiful kiosk near Scutaria and a stately palace on the Bosphorus, without which adventitious advantages she might perhaps have hardly succeeded in winning the heart of so experienced a warrior as Omar Pasha.

Thus it was that I found myself one broiling sunny morning leaning over the side of a transport just then dropping her anchor in Balaclava Bay.

The scorching rocks frowned down on the scorching sea; the very planks on the deck glistened with the heat. There was no shade on land, and not a breath of air ruffled the shining bosom of the water. The harbor was full, aye, choked with craft of every rig and every tonnage; whilst long wicked-looking steamers and huge unwieldy troop-ships dotted the surface of the land-locked bay. The union-jack trailed idly over our stern, the men were all on deck, gazing with eager faces on that shore which combined for *them* the realities of history with the fascinations of romance. Young soldiers were they, mostly striplings of eighteen and twenty summers with the smooth cheeks, fresh color, and stalwart limbs of the Anglo-Saxon race—too good to fill a trench! And yet what would be the fate of at least two-thirds of that keen light-hearted draft? *Vestigia nulla retrorsum.* Many a time has it made my heart ache to see a troop-ship ploughing relentlessly onward with her living freight to "the front"—many a time have I recalled Æsop's fable, and the footprints that were all *towards* the lion's den—many a time have I thought how every unit there in red was himself the centre of a little world at home; and of the gray heads that would tremble, and the loving faces that would pale in peaceful villages far away in England, when no news came from foreign parts of "our John," or when the unrelenting *Gazette* arrived at last and proclaimed, as too surely it would, that he was coming back "never, never no more."

Boom!—there it is again! Every eye lightens at that dull, distant sound. Every man's pulse beats quicker, and his head towers more erect, for he feels that he has arrived at the *real thing* at last. No sham fighting is going on over yonder, not two short leagues from where he stands—no mock bivouac at Chobham, nor practice in Woolwich Marshes, nor meaningless pageant in the Park: that iron voice carries *death* upon its every accent. For those in the trenches it is a mere echo—the unregarded consequence that necessarily succeeds the fierce rush of a round shot or the wicked whistle of a shell; but for us here at Balaclava, it is one of the pulsations of England's life-blood—one of the ticks, so to speak, of that great Clock of Doom which points ominously to the downfall of the beleaguered town.

Boom! Yes, there it is again; you cannot forget why you are here. Day and night, sunshine, and storm, scarce five minutes elapse in the twenty-four hours without reminding you of the work in hand. You ride out from the camp for your afternoon exercise, you go down to Balaclava to buy provisions, or you canter over to the monastery at St. George's, to visit a sick comrade—the iron voice tolls on. In the glare of noon, when everything else seems drowsy in the heat, and the men lie down exhausted in the suffocating trenches—the iron voice tolls on. In the calm of evening, when the breeze is hushed and still, and the violet sea is sleeping in the twilight—the iron voice tolls on. So when the flowers are opening in the morning, and the birds begin to sing, and reviving nature, fresh and dewy, seems to scatter health and peace and goodwill over the earth—the iron voice tolls on. Nay, when you wake at midnight in your tent from a dream of your far-away home—O! what a different scene to this!—tired as you may be, ere you have turned to sleep once more, you hear it again. Yes, at midnight as at noon, at morn as at evening, every day and all day long, Death is gathering his harvest—and the iron voice tolls on.

"Very slack fire they seem to be keeping up in the front," yawns out Ropsley, who had just joined me on the deck, and to whom the siege and all its accessories are indeed nothing new. Many a long and weary month he been listening to that sound; and what with his own ideas on the subject, and the information a naturally acute intellect has acquired touching the proceedings of the besiegers, his is indeed a familiarity which "breeds contempt."

"Any news from the camp?" he shouts out to a middy in a man-of-war's boat passing under our stern. The middy, a thorough

specimen of an English boy, with his round laughing face and short jacket, stands up to reply.

"Another sortie! No end of fellows killed; and *they say* the Malakhoff is blown up."

Our young soldiers listened eagerly to the news. They have heard and read of the Malakhoff for many a day, and though their ideas of the nature and appearance of that work are probably of a somewhat confused description, they are all athirst for intelligence, and prepared to swallow everything connected with the destruction of that or any other of the defences with a faith that is, to say the least of it, a sad temptation to the laughter-loving informant.

A middy, though from some organic cause of which I am ignorant, is always restless and impatient towards the hour of noon; and our friend plumps down once more in the stern of his gig, and bids his men "give way;" for the sun is by this time high in the heavens; so we take our places in the ship's boat which our own captain politely provides for us, and avoiding the confusion of a disembarkation of men and stores, Ropsley, Bold, and I leap ashore at Balaclava, unencumbered save by the slender allowance of luggage which a campaign teaches the most luxurious to deem sufficient.

Ashore at Balaclava! What a scene of hurry and crowding and general confusion it is! Were it not that every second individual is in uniform and bearded to the waist, it would appear more like the mart of some peaceful and commercial sea-port, than the threshold of a stage on which is being fought out to the death one of the fiercest and most obstinate struggles which history has to record on her blood-stained pages. There are no women, yet the din of tongues is perfectly deafening. Hurrying to and fro, doing as little work with as much labor as possible, making immense haste with small speed, and vociferating incessantly at the top of their voices, Turks and Tartars, Armenians, Greeks, and Ionians, all accosted by the burly English soldier under the generic name of "Johnny," are flitting aimlessly about, and wasting her Majesty's stores in a manner that would have driven the late Mr. Hume frantic. Here a trim sergeant of infantry, clean and orderly, despite his war-worn looks and patched garments, drives before him a couple of swarthy nondescripts, clad in frieze, and with wild elf-locks protruding over their jutting foreheads, and twinkling Tartar eyes. They stagger under huge sacks of meal, which they are carrying to yonder storehouse with a sentry pacing his short walk at the door. The sacks have been furnished by contract, so the seams are badly sewn; and the meal likewise furnished by contract, and of inferior quality, is rapidly escaping, to leave a white track in the mud, also a contract article, and of the deepest, stickiest, and most enduring quality. The labors of the two porters will be much lightened ere they reach their destination; but this is of less moment, inasmuch as the storehouse to which they are proceeding is by no means water-tight, and the first thunder-storm that sweeps in from the Black Sea is likely much to damage its contents. It is needless to add that this edifice of thin deal planks has been constructed by contract for the use of her Majesty's Government.

A little further on, a train of mules, guided by a motley crowd of every nation under heaven, and commanded by an officer in the workmanlike uniform of the Land Transport, is winding slowly up the hill. They have emerged from a perfect sea of mud, which even at this dry season shows not the least tendency to harden into consistency, and they will probably arrive at the front in about four hours, with the loss of a third only of their cargo, consisting of sundry munitions which were indispensable last week, and might have been of service the day before yesterday but the occasion for which has now passed away for ever.

A staff officer on a short sturdy pony gallops hastily by, exchanging a nod as he passes with a beardless cornet of Dragoons, whose English charger presents a curious study of the anatomy of a horse. He pulls up for an instant to speak to Ropsley, and the latter turns to me and says,

"Not so bad as I feared, Vere. It was a mere sortie, after all, and we drove them back very handsomely, with small loss on our side. The only officer killed was young——, and he was dying, poor fellow! at any rate, of dysentery."

This is the news of the day here, and the trenches form just such a subject of conver-

sation before Sebastopol as does the weather in a country house in England—a topic never new, but never entirely worn out.

Side by side, Ropsley and myself are journeying up the hill towards the front. A sturdy bât-man has been in daily expectation of his master's return, and has brought his horses down to meet him. It is indeed a comfort to be again in an English saddle—to have the lengthy, powerful frame of an English horse under one—and to hear the homely, honest accents of a *provincial* English tongue. When a man has been long amongst foreigners, and especially serving with foreign troops, it is like being at home again to be once more within the lines of a British army, and to add to the pleasures of our ride, although the day is cloudless and insufferably hot in the valleys, there is a breeze up here; and a pure bracing air that reaches us from the heights on which the army is encamped.

It is a wild, picturesque scene, not beautiful, yet full of interest and incident. Behind us lies Balaclava, with its thronging harbor and its busy crowds, whose hum reaches us even here, high above the din. It is like looking down on an ant-hill to watch the movements of the shifting swarm.

On our right, the plain, stretching far and wide, is dotted with the Land Transport—that necessary evil so essential to the very existence of an army; and their clustering wagons and scattered beasts carry the eye onwards to a dim white line formed by the neat tents and orderly encampment of the flower of French cavalry, the gallant and dashing Chasseurs d'Afrique.

On our left, the stable call of an English regiment of Light Dragoons reaches us from the valley of Kadikoi, that Crimean Newmarket, the doings of which are actually chronicled in *Bell's Life!* Certainly an Englishman's nationality is not to be rooted out of him even in the jaws of death. But we have little time to visit the race-course or the lines—to pass our comments on the condition of the troopers, or to gaze open-mouthed at the wondrous field-batteries that occupy an adjoining encampment—moved by teams of twelve horses each, perhaps the finest animals of the class to be seen in Europe, with every accessory of carriage, harness, and appointments, so perfect as not to admit of improvement, yet, I believe, not found to answer in actual warfare. Our interest is more awakened by another scene. We are on classic ground now, for we have reached the spot whence

> "Into the valley of death
> Rode the six hundred!"

Yes, stretching down from our very feet, lies that mile-and-a-half gallop which witnessed the boldest deed of chivalry performed in ancient or modern times. Well might the French general exclaim, "*C'est magnifique!*" although he added, significantly, "*mais ce n'est pas la guerre.*" The latter part of his observation is a subject for discussion, but of the former there is and there can be but one opinion. *Magnifique* indeed it must have been to see six hundred horsemen ride gallantly down to almost *certain* death—every heart beating equally high, every sword striking equally hard and true.

> "Groom fought like noble, squire like knight,
> As fearlessly and well."

Not a child in England at this day but knows as if he had been there, the immortal valley of Balaclava. It is needless to describe its situation, to dwell upon the position they were ordered to carry, or the fire that poured in upon front, flanks, aye, and rear, of the attacking force. This is all matter of history; but as the valley stretched beneath us, fresh, green, and smiling peacefully in the sun, it required but little imagination to call up the stirring scene of which it had been the stage. Here was the very ground on which the Light Brigade were drawn up; every charger quivering with excitement, every eye flashing, every lip compressed with the sense of coming danger. A staff officer rides up to the leader and communicates an order. There is an instant's pause. Question and reply pass like lightning, and the aide-de-camp points to a dark, grim mass of artillery bristling far away down yonder in the front. Men's hearts stop beating, and many a bold cheek turns pale, for there is more excitement in uncertainty than in actual danger. The leader draws his sword, and faces flush, and hearts beat high once more. Clear and sonorous is his voice as he gives the well-known word; gallant and chivalrous his bearing as he takes his place—that place of privilege—*in front*—"*Noblesse oblige*," and can he be otherwise than gallant and chivalrous and devoted, for is he not a *gentleman*? and yet, to the honor of our countrymen be it spoken, not a man of

that six hundred, of any rank, but was as gallant and chivalrous and devoted as he—he has said so himself a hundred times.

So the word is given, and the squadron leaders take it up, and the Light Brigade advances at a gallop; and a deadly grasp is on the sword, and the charger feels his rider's energy as he grips him with his knees, and holding him hard by the head urges him resolutely forward—to death!

And now they cross the line of fire: shot through the heart, an aide-de-camp falls headlong from the saddle, and his loose horse gallops on, wild and masterless, and wheels in upon the flank, and joins the squadron once more. It is begun now. Man upon man, horse upon horse, are shot down and rolled over; yet the survivors close in, sterner, bolder, fiercer than before, and still the death-ride sweeps on.

"Steady, men—forward!" shouts a chivalrous squadron leader, as he waves his glittering sword above his head, and points towards the foe. Clear and cheerful rings his voice above the tramp of horses and the rattle of small-arms and the deadly roar of artillery. He is a model of beauty, youth, and gallantry—the admired of men, the darling of women, the hope of his house.—Do not look again.—A round shot has taken man and horse, he is lying rolled up with his charger, a confused and ghastly mass. Forward! the squadron has passed over him, and still the death-ride sweeps on.

The gaps are awful now, the men told off by threes look in vain for the familiar face at right or left; every trooper feels that he must depend on himself and the good horse under him, but there is no wavering. Officers begin to have misgivings as to the result, but there is no hesitation. All know they are galloping to destruction, yet not a heart fails, not a rein is turned. Few, very few are they by this time, and still the death-ride sweeps on. They disappear in that rolling sulphurous cloud, the portal of another world; begrimmed with smoke, ghastly with wounds, comrade cannot recognize comrade, and officers look wildly round for their men; but the guns are still before them—the object is not yet attained—the enemy awaits them steadily behind his gabions, and the fire from his batteries is mowing them down like grass. If but one man is left, that one will still press forward: and now they are on their prey. A tremendous roar of artillery shakes the air. Mingled with the clash of swords and the plunge of horses, oath, prayer, and death-shriek fly to heaven. The batteries are reached and carried. The death-ride sweeps over them, and it is time to return.

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In twos, and threes, and single files, the few survivors stagger back to the ground from whence, a few short minutes ago, a gallant band had advanced in so trim, so orderly, so soldier-like a line.

The object has been attained, but at what a sacrifice! Look at yon stalwart trooper sinking on his saddle-bow, sick with his death-hurt, his head drooping on his bosom, his sword hanging idly in his paralyzed right-hand, his failing charger, wounded and feeble, nobly bearing his master to safety ere he falls to rise no more. The soldier's eye brightens for an instant as he hears the cheer of the Heavy Brigade completing the work he has pawned his life to begin. Soon that eye will glaze and close forever. Men look round for those they knew and loved, and fear to ask for the comrade who is down, stiff and stark, under those dismounted guns and devastated batteries; horses come galloping in without riders; here and there a dismounted dragoon crawls feebly back to join the remnants of what was once his squadron, and by degrees the few survivors get together and form something like an ordered body once more. It is better not to count them, they are so few, so *very* few. Weep, England, for thy chivalry! mourn and wring thy hands for that disastrous day; but smile with pride through thy tears, thrill with exultation in thy sorrow, to think of the sons thou canst boast, of the deed-of-arms done by them in that valley before the eyes of gathered nations—of the immortal six hundred—thy children, every man of them, that rode the glorious death-ride of Balaclava!

"That was a stupid business," observed Ropsley, as he brought his horse alongside of mine, and pointed down the valley; "quite a mistake from beginning to end. What a licking we deserved to get, and what a licking we *should* have got if our dragoons were not the only cavalry in the world that will *ride straight*."

"And yet what a glorious day!" I exclaimed, for the wild cheer of a charge

seemed even now to be thrilling in my ears. "What a chance for a man to have! even if he did not survive it. What a proud sight for the army. Oh, Ropsley, what would I give to have been there!"

"*Not whist*, my dear fellow," replied my less enthusiastic friend; "that is not the way to *play the game*, and no man who makes mistakes deserves to *win*. I have a theory of my own about cavalry, they should never be offered too freely. I would almost go so far as to say they should not be used till a battle is won. At least they should be kept in hand till the last moment, and then let loose like lightning. What said the Duke? "There are no cavalry on earth like mine, but I can only use them *once*;' and no man knew so well as he did the merits and failings of each particular arm. Nor should you bring the same men out again too soon after a brilliant charge; let them have a little time to get over it, they will *come* again all the better. Never *waste* any thing in war, and never run a chance when you can stand on a certainty. But here we are at the camp of the First Division. Yonder you may catch a glimpse of the harbor and a few houses of the town of Sebastopol. How quiet it looks this fine day! quite the sort of place to take the children to for sea-bathing at this time of year! I am getting tired of the *outside*, though, Egerton; I sometimes think we shall *never* get in. There they go again," he added, as a white volume of smoke rose slowly into the clear air, and a heavy report broke dully on our ears; "there they go again, but what a slack fire they seem to be keeping up; we shall never do any good till we try a *coup de main*, and take the place by assault;" so speaking, Ropsley picked his way carefully amongst tent-ropes and tent-pegs, and all the impediments of a camp, to reach the main street, so to speak, of that canvas town, and I followed him, gazing around me with a curiosity rather sharpened than damped by the actual warfare I had already seen on so much smaller a scale.

There must have been at least two hundred thousand men at that time disposed around the beleaguered town, this without counting the Land Transport and followers of an army, or the crowds of non-combatants that thronged the ports of Kamiesch and Balaclava. The white town of tents stretched away for miles, divided and subdivided into streets and alleys; you had only to know the number of his regiment to find a private soldier, with as great a certainty as you could find an individual in London if you knew the number of his house and the name of the street where he resided—always presupposing that the soldier had not been killed the night before in the trenches, a casuality by no means to be overlooked. We rode down the main street of the Guards division, admired the mountaineer on sentry at the adjoining camp of the Highland brigade, and pulled up to find ourselves at home at the door of Ropsley's tent, to which humble abode my friend welcomed me with as courteous an air and as much concern for my comfort as he would have done in his own luxurious lodgings in the heart of May-fair. A soldier's life had certainly much altered Ropsley for the better. I could see he was popular in his regiment. The men seemed to welcome back the Colonel (a captain in the Guards holds the rank of lieutenant-colonel in the army), and his brother officers thronged into his tent ere we had well entered it ourselves, to tell him the latest particulars of the siege, and the ghastly news that every morning brought fresh and bloody from the trenches.

As a stranger, or rather as a guest, I was provided with the seat of honor, an old shrivelled bullock-trunk that had escaped the general loss of baggage on the landing of the army, previous to the battle of the Alma, and which, set against the tent-pole for a "back," formed a commodious and delightful resting-place. The said tent-pole, besides being literally the main-stay and prop of the establishment, fulfilling all the functions of a wardrobe, a chest of drawers, and a dressing-table; for from certain nails artfully disposed on its slender circumference, depended the few articles of costume and necessaries of the toilet which formed the whole worldly wealth of the *ci-devant* London dandy.

The dandy aforesaid, sitting on his camp-bedstead in his ragged flannel shirt, and sharing that seat with two other dandies more ragged than himself, pledged his guest in a silver-gilt measure of pale ale, brought up from Balaclava at a cost of about half-a-guinea a bottle, and drank with a gusto such as the best-flavored champagne had never wooed from a palate formerly too delicate and fastidious to be pleased with the nectar of the immortals themselves, now appreciat-

ing with exquisite enjoyment the strongest liquids, the most acrid tobacco, nay, the Irish stew itself, cooked by a private soldier at a camp fire, savory and delicious, if glutinous with grease and reeking of onions.

"Heavy business the night before last," said a young Guardsman with a beautiful girlish face, and a pair of uncommonly dirty hands garnished with costly rings—a lad that looked as if he ought to be still at school, but uniting the cool courage of a man with the mischievous light-hearted spirits of a boy. "Couldn't get a wink of sleep for them at any time—never knew 'em so restless. Tell you what, Colonel, 'rats leave a falling house;' it's my belief there's *something up* now, else why were we all relieved at twelve o'clock instead of our regular twenty-four hours in the trenches? Good job for me, for I breakfasted with the General, and a precious blow-out he gave me. Turkey, my boys! and cherry-brandy out of a shaving-pot! Do you call that nothing?'

"Were you in the advanced trenches?" inquired Ropsley, stopping our young friend's gastronomic recollections; "and did you see poor —— killed?"

The lad's face fell in an instant; it was with a saddened and altered voice that he replied,

"Poor Charlie! yes, I was close to him when he was hit. You know it was his first night in the trenches, and he was like a boy out of school. Well, the beggars made a sortie, you know, on the left of our right attack; they couldn't have chosen a worse place; and he and I were with the light company when we drove them back. The men behaved admirably, Colonel; and poor Charlie was so delighted, not being used to it, you know," proceeded the urchin, with the gravity of a veteran, "that it was impossible to keep him within bounds. He had a revolver (that wouldn't go off, by the way), and he had filled a soda-water bottle with powder and bullets and odd bits of iron, like a sort of mimic shell. Well, this thing burst in his hand and deuced near blew his arm off, but it only made him keener. When the Russians retired he actually ran out in front and threw stones at them. I tried all I could to stop him." (The lad's voice was getting husky now.) "Well, Colonel, it was bright moonlight, and I saw a Russian private take a regular 'pot-shot' at poor Charlie. He hit him just below the waist-belt; and we dragged him into the trenches, and there he—he died. Colonel, this 'baccy of yours is very strong, I'll just walk into the air for a moment, if you'll excuse me. I'll be back directly."

So he rose and walked out, with his face turned from us all; and though there was nothing to be ashamed of in the weakness, I think not one of us but knew he had gone away to have his "cry" out, and liked him all the better for his mock manliness and his feeling heart.

Ere he came back again the bugles were sounding for afternoon parade. Orderly corporals were running about with small slips of paper in their hands, the men were falling in, and the fresh relief, so diminished every four-and-twenty hours, was again being got ready for the work of death in the trenches.

CHAPTER XXXVII.—"A QUIET NIGHT."

On an elevated *plateau*, sloping downward to a ravine absolutely paved with iron, in the remains of shot and shell fired from the town during its protracted and vigorous defence, are formed in open column "the duties" from the different regiments destined to carry on the siege for the next four-and-twenty hours. Those who are only accustomed to see British soldiers marshalled neat and orderly in Hyde Park, or manœuvring like clock-work in "the Phœnix," would hardly recognize in that motley, war-worn band the staid and uniform figures which they are accustomed to contemplate with pride and satisfaction as the "money's-worth" of a somewhat oppressive taxation. The Highlanders—partly from the fortune of war, partly from the nature of their dress—are less altered from their normal exterior than the rest of the army, and the Guardsman's tall figure and bearskin cap still stamp him a Guardsman, notwithstanding patched clothing and much-worn accoutrements; but some of the line regiments, which have suffered considerably during the siege, present the appearance of regular troops only in their martial bearing and the scrupulous discipline observed within their ranks. To the eye of a soldier, however, there is something very pleasing and "workman-like" in the healthy, confident air of the men, and the "matter-of-course" manner in which they seem to contemplate the duty before them. Though their coats may be out at elbows, their firelocks are

bright and in good order, while the haversacks and canteens slung at their sides seem to have been carefully replenished with a view to keeping up that physical vigor and stamina for which the British soldier is so celebrated, and which, with his firm reliance on his officers, and determined bull-dog courage, render him so irresistible an enemy.

There are no troops who are so little liable to panic—whose *morale*, so to speak, is so difficult to impair, as our own. Napoleon said they "never knew when they were beaten." And how often has this generous ignorance saved them from defeat! Long may it be ere they learn the humiliating lesson! But that they are not easily disheartened may be gathered from the following anecdote, for the truth of which many a Crimean officer will readily vouch:—

Two days after the disastrous attack of the 18th of June, 1855, a private soldier on fatigue duty was cleaning the door-step in front of Lord Raglan's quarters; but his thoughts were running on far other matters than holystone and whitewash, for on a staff-officer of high rank emerging from the sacred portal, he stopped the astonished functionary with an abrupt request to procure him an immediate interview with the Commander-in-Chief.

"If you please, Colonel," said the man, standing at "attention," and speaking as if it was the most natural thing in the world, "if it's not too great a liberty, I wants to see the General immediate and particular!"

"Impossible! my good fellow," replied the Colonel—who, like most brave men, was as good-natured as he was fearless—"if you have any complaint to make, tell it me; you may be sure it will reach Lord Raglan, and if it is just it will be attended to."

"Well, sir, it's not exactly a complaint," replied the soldier, now utterly neglecting the door-step, "but more a request, like: and I wanted to see his lordship special, if so be as it's not contrary to orders."

The Colonel could hardly help laughing at the coolness with which so flagrant a military solecism was urged, but repeated that Lord Raglan was even then engaged with General Pelissier, and that the most he could do for his importunate friend was to receive his message and deliver it to the Commander-in-Chief at a favorable opportunity.

The man reflected an instant, and seemed satisfied. "Well, Colonel," he said, "we *knows you*, and we *trusts* you. I speak for myself and comrades, and what I've got to say to the General is this here. We made a bad business o' Monday, and we knows the reason why. You let *us* alone. There's plenty of us to do it; only you give us leave, and issue an order that not an officer nor a non-commissioned officer is to interfere, and *we*, the private soldiers of the British army, will have that place for you, if we pull the works down with our fingers, and crack the stones with our teeth!"

"And what," said the Colonel, utterly aghast at this unheard-of proposal, "what——"

"What time will we be under arms to do it?" interrupted the delighted delegate, never doubting but that his request was now as good as granted,—"why, at three o'clock to-morrow morning; and you see, Colonel, when the thing's done, if me and my company *wasn't the first lads in!*"

Such is the material of which these troops are made who are now waiting patiently to be marched down to the nightly butchery of the trenches.

"It reminds one of the cover-side at home," remarked Ropsley, as we cantered up to the parade and dismounted; "one meets fellows from all parts of the camp, and one hears all the news before the sport begins. There goes the French relief," he added, as our allies went slinging by, their jaunty, disordered step and somewhat straggling line of march forming as strong a contrast to the measured tramp and regular movements of our own soldiers, as did their blue frock-coats and crimson trousers to the *véritable rouge* for which they had conceived so high a veneration. Ere they have quite disappeared our own column is formed. The brigade-major on duty has galloped to and fro, and seen to every thing with his own eyes. Company officers, in rags and tatters, with swords hung sheathless in worn white belts, and wicker-covered bottles slung in a cord over the hip, to balance the revolver on the other side,—and brave, gentle hearts beating under those tarnished uniforms—and sad experiences of death, and danger, and hardship behind those frank faces and honest, kindly smiles,—have inspected their men and made their reports, and "fallen in" in their proper places; and the word is given, and its head moves off—"By the left; quick, march!"—and the col-

umn winds quietly down into the valley of the shadow of death.

Ropsley is field-officer of the night, and I accompany him on his responsible duty, for I would fain see more of the town that has been in all our thoughts for so long, and learn how a siege is urged on so gigantic a scale.

The sun is just setting, and gilds the men's faces, and the tufts of arid grass above their heads in the deepening ravine, with a tawny orange hue peculiar to a sunset in the East. The evening is beautifully soft and still, but the dust is suffocating, rising as it does in clouds from the measured tread of so many feet: and there is a feeling of depression, a weight in the atmosphere, such as I have often observed to accompany the close of day on the shores of the Black Sea. Even the men seem to feel its influence—the whispered jest, the ready smile which usually accompanies a march is wanting; the youngest ensign looks thoughtful, and as if he were brooding on his far-away home; and the lines deepen on many a bearded countenance as we wind lower and lower down the ravine and reach the first parallel, which to some now present must be so forcible a reminder of disappointed hopes, fruitless sacrifices, and many a true and hearty comrade who shall be friend and comrade no more.

Ropsley has a plan of the works in his hand, which he studies with eager attention. He hates soldiering—so he avows—yet is he an intelligent and trustworthy officer. With his own ideas on many points at variance with the authorities, and which he never scruples to avow, he yet rigidly carries out every duty entrusted to him, and if the war should last promises to ascend the ladder as rapidly as any of his comrades. It is not the path he would have chosen to distinction, nor are the privations and discomforts of a soldier's life at all in harmony with his refined perceptions and luxurious habits; but he has embarked on the career, and, true to his principle, he is determined to "make the most of it." I think, too, that I can now perceive in Ropsley a spice of romance foreign to his earlier character. It is a quality without which, in some shape or other, nothing great was ever yet achieved on earth. Yet how angry would he be if he knew that I thought he had a grain of it in his strong practical character which he flatters himself is the very essence of philosophy and common sense.

As we wind slowly up the now well-trodden covered way of the first parallel, from the shelter of which nothing can be seen of the attack or defence, I am forcibly reminded of the passages in a theatre, which one threads with blindfold confidence in anticipation of the blaze of light and excitement on which one will presently emerge. Ropsley smiles at the conceit as I whisper it in his ear.

"What odd fancies you have," says he, looking up from the plan on which he has been bending his earnest attention. "Well, you wont have long to wait for the opera; there's the first bar of the overture already!" As he speaks he pulls me down under th embankment, while a shower of dust and gravel, and a startling explosion immediately in front, warn us that the enemy has thrown a shell into the open angle of the trench, with a precision that is the less remarkable when we reflect how many months he has been practising to attain it.

"Very neatly done," observes Ropsley, rising from his crouching attitude with the greatest coolness; "they seldom trouble one much so soon as this. Probably a compliment to you, Egerton," he adds, laughing. "Now let us see what the damage is?"

Stiff and upright as the ramrod in his firelock, which rattles to his salute, a sergeant of the Guards marches up and makes his report:—"Privates Wood and Jones wounded slightly, sir; Lance-corporal Smithers, killed."

They pass us as they are taken to the rear; the lance-corporal has been shot through the heart, and must have died instantaneously. His face is calm and peaceful, his limbs are disposed on the stretcher as if he slept. Poor fellow! 'Tis quick work, and in ten minutes he is forgotten. My first feeling is one of astonishment at my own hardness of heart in not being more shocked at his fate.

So we reach the advanced trenches without more loss. It is now getting quite dark, for the twilight in these latitudes is but of short duration. A brisk fire seems to be kept up on the works of our allies, responded to by the French gunners with ceaseless activity; but our own attack is comparatively unmolested, and Ropsley makes his arrangements and plants his sentries in a calm, leisurely way that inspires the youngest

soldier with confidence, and wins golden opinions from the veterans who have spent so many bleak and weary nights before Sebastopol.

We are now in the advanced trenches. Not three hundred paces to our front are yawning the deadly batteries of the Redan. The night is dark as pitch. Between the intervals of the cannonade, kept up so vigorously far away on our right, we listen breathlessly as the night-breeze sweeps down to us from the town, until we can almost fancy we hear the Russians talking within their works. But the "pick, pick," of our own men's tools, as they enlarge the trench, and their stifled whispers and cautious tread, deaden all other sounds. Each man works with his firelock in his hand; he knows how soon it may be needed. Yet the soldier's ready jest and quaint conceit is ever on the lip, and many a burst of laughter is smothered as it rises, and enjoyed all the more keenly for the constraint.

"Not so much noise there," says Ropsley, in his quiet authoritative tone, as the professed buffoon of the light company indulges in a more lively sally than usual; "I'll punish ny man that speaks above a whisper. Come, my lads," he adds good-humoredly, "keep quiet now, and perhaps it will be OUR turn before the night is over!" The men return to their work with a will, and not another word is heard in the ranks.

The officers have established a sort of headquarters at a *place d'armes*, or re-assembling spot near the centre of their own "attack." Three or four are coiled up in different attitudes, beguiling the long dark hours with whispered jests and grave speculations as to the intentions of the enemy. Here a stalwart captain of Highlanders stretches his huge frame across the path, puffing forth volumes of smoke from the short black pipe that has accompanied him through the whole war—the much-prized "cutty" that was presented to him by his father's forester when he shot the royal stag in the "pass abune Craig-Owar;" there a slim and dandy rifleman passes a wicker-covered flask of brandy-and-water to a tall sedate personage who has worked his way through half-a-dozen Indian actions to be senior captain of a line regiment, and who, should he be fortunate enough to survive the present siege, may possibly arrive at the distinguished rank of a Brevet-Major. He prefers his own bottle of cold tea; as it gurgles into his lips the Highlander pulls a face of disgust.

"Take those long, indecent legs of yours out of the way, Sandy," says a merry voice, the owner of which, stumbling over these brawny limbs in the darkness, makes his way up to Ropsley, and whispers a few words in his ear which seems to afford our colonel much satisfaction.

"You couldn't have done it better," says he to the new arrival, a young officer of engineers, the "bravest of the brave," and "the gayest of the gay;" "I could have spared you a few more men, but it is better as it is. I hate harrassing our fellows, if we can help it. What will you have to drink?"

"A drain at the flask, first, colonel," answers the light-hearted soldier; "I've been on duty now, one way and another, for eight-and-forty hours, and I'm about beat. Sandy, my boy, give us a whiff out of 'the cutty.' I'll sit by you. You remind me of an opera-dancer, in that dress. Mind, you dine with me to-morrow, if you're not killed."

The Highlander growls out a gruff affirmative. He delights in his volatile friend; but he is a man of few words, although his arm is weighty and his brain is clear.

A shell shrieks and whistles over our heads. We mark it revolving bright and beautiful, like a firework through the darkness. It lights far away to our rear, and bounds once more from the earth ere it explodes with a loud r ort.

"Not much mischief done by that gentleman," observes Ropsley, taking his cigar from his mouth; "he must have landed clear of all our people. We shall soon have another from the same battery. I wish I knew what they are doing over yonder," he adds, pointing significantly in the direction of the Redan.

"I think I can find out for you, Colonel," says the engineer; "I am going forward to the last 'sap,' and I shall not be very far from them there. Your sharpshooters are just at the corner, Green," he adds to the rifleman, "wont you come with me?" The latter consents willingly; and as they rise from their dusty lair I ask leave to accompany them, for my curiosity is fearfully excited, and I am painfully anxious to know what the enemy is about. The last "sap" is a narrow and shallow trench, the termination of which is but a short distance from the Russian work. It is discontinued at the precipitous declivity

which here forms one side of the well-known Woronzoff ravine; and from this spot, dark as it is, the sentry can be discerned moving to and fro—a dusky, indistinct figure—above the parapet of the Redan.

The engineer officer and Green of the Rifles seat themselves on the very edge of the ravine; the former plucks a blade or two of grass, and flings them into the air.

"They can't hear us with this wind," says he. "What say you, Green; wouldn't it be a good lark to creep in under there, and make out what they're doing?"

"I'm game!" says Green, one of those dare-devil young gentlemen to be found amongst the subalterns of the British army, who would make the same reply were it a question of crossing that glacis in the full glare of day to take the work by assault, single-handed. "Put your sword off, that's all, otherwise you'll make such a row, that our own fellows will think they're attacked, and fire on us like blazes. Mind you, my chaps have had lots of practice, and can hit a haystack as well as their neighbors. Now then, are you ready? Come on."

The engineer laughed, and unbuckled his sabre.

"Good afternoon, Mr. Egerton, in case I shouldn't see you again," said he; and so the two crept silently away upon their somewhat hazardous expedition.

I watched their dark figures with breathless interest. The sky had lifted a little, and there was a ray or two of moonlight struggling fitfully through the clouds. I could just distinguish the two English officers as they crawled on hands and knees amongst the slabs of rock and inequalities of ground which now formed their only safety. I shuddered to think that if I could thus distinguish their forms, why not the Russian riflemen?—and what chance for them then, with twenty or thirty "Minies" sighted on them at point-blank distance? However, "Fortune favors the brave;" the light breeze died away, and the moon was again obscured. I could see them no longer, and I knew that by this time they must have got within a very few paces of the enemy's batteries, and that discovery was now certain death. The ground, too, immediately under the Russian work was smoother and less favorable to concealment than under our own. The moments seemed to pass very slowly. I scarcely dared to move, and the tension of my nerves was absolutely painful, every faculty seeming absorbed in the one concentrated effort of listening.

Suddenly a short, sharp stream of light, followed by the quick, angry report of the Minié—then another and another—they illumine the night for an instant; and during that instant I strain my eyes in vain to discover the two dark creeping forms. And now a blinding glare fills our own trenches—the figures of the men coming out like phantoms in their different attitudes of labor and repose. The enemy has thrown a fire-ball into our works to accertain what we are about. Like the pilot fish before the shark, that brilliant messenger is soon succeeded by its deadly followers, and ere I can hurry back to the rallying point of the attack, where I have left Ropsley and his comrades, a couple of shells have already burst amongst our soldiers, dealing around them their quantum of wounds and death, whilst a couple more are winging their way like meteors over our heads, to carry the alarm far to the rear, where the gallant blue-jackets have established a tremendous battery, and are at this moment in all probability chafing and fretting that they are not nearer the point of danger.

"Stand to your arms! Steady, men, steady!" is the word passed from soldier to soldier along the ranks, and the men spring like lions to the parapet, every heart beating high with courage, every firelock held firmly at the charge. They are tired of "long bowls" now, and would fain have it out with the bayonet.

The fire from the Redan lights up the intervening glacis, and as I rush hurriedly along the trench, stooping my head with instinctive precaution, I steal a glance or two over the low parapet, which shows me the figure of a man running as hard as his legs can carry him towards our own rallying point. He is a mark for fifty Russian rifles, but he speeds on nevertheless. His cheery voice rings through all the noise and confusion, as he holloas to our men not to fire at him.

"Hold on, my lads," he says, leaping breathlessly into the trench; "I've had a precious good run for it. Where's the Colonel?"

His report is soon made. It is the young officer of engineers who thus returns in haste from his reconnoitring expedition. His companion, Green, has reached his own regiment

by another track, for they wisely separated when they found themselves observed, and strange to say, nothwithstanding the deadly fire through which they have "run the gauntlet," both are unwounded. The engineer confers with Ropsley in a low voice.

"They only want to draw off our attention, Colonel," says he; "I am quite sure of it. When I was under the Redan I could hear large bodies of men moving towards their left. That is the point of attack, depend upon it. There they go on our right! I told you so. Now we shall have it, hot and heavy, or I'm mistaken."

Even while he speaks a brisk fire is heard to open on our right flank. The clouds clear off, too, and the moon, now high in the heavens, shines forth unveiled. By her soft light we can just discern a dark, indistinct mass winding slowly along across an open space of ground between the Russian works. The rush of a round shot from one of our own batteries whizzes over our heads. That dusky column wavers, separates, comes together again, and presses on. Ropsley gets cooler and cooler, for it is coming at last.

"Captain McDougal," says he to that brawny warrior, who does not look the least like an opera dancer now, as he rears his six feet of vigor on those stalwart supporters, "I can spare all the Highlanders; form them directly, and move to your right flank. Do not halt till you reach the ground I told you of. The Rifles and our own Light Company will stand fast! Remainder, right, form four deep—march!"

There is an alarm along the whole line. Our allies are engaged in a brisk cannonade for their share, and many an ugly missile hisses past our ears from the foe, or whistles over our heads from our own supports. Is it to be a general attack?—a second Inkermann, fought out by moonlight? Who knows? The uncertainty is harassing, yet attended with its own thrilling excitement—half a pleasure, half a pain.

A few of our own people (we cannot in the failing light discover to what regiment they belong) are giving way before a dense mass of Russian infantry that outnumber them a hundred to one. They have shown a determined front for a time, but they are sorely pressed and overpowered, and by degrees they give back more and more. The truth must out—they are on the point of turning tail and running away. A little fiery Irishman stands out in front of them; a simple private is he in the regiment, and never likely to reach a more exalted rank, for, like a' great men, he has a darling weakness, and the temptation to which he cannot but succumb is inebriety—the pages of the Defaulters' Book call it "habitual drunkenness." Nevertheless, he has the heart of a hero. Gesticulating furiously, and swearing, I regret to say, with blasphemous volubility, he tears the coat from his back, flings his cap on the ground, and tossing his arms wildly above his head, thus rebukes, like some Homeric hero, his more prudent comrades—

"Och, bad luck to ye, rank cowards and shufflers that ye are! and bad luck to the day I 'listed! and bad luck to the rig'ment that's disgracin' me! Would I wear the uniform, and parade like a soldier again, when it's been dirtied by the likes of you? 'Faith, not I, ye thunderin' villains. I'll tread and I'll trample the coat, and the cap, and the facin's, and the rest of it; and I'll fight in my shirt, so I will, if they come on fifty to one. Hurroo!"

Off goes his musket in the very faces of the enemy; with a rush and a yell he runs at them with the bayonet. His comrades turn, and strike in vigorously with the hero. Even that little handful of men serves for an instant to check the onward progress of the Russians. By this time the supports—Guards, Highlanders, and the flower of the British infantry—are pouring from their entrenchments; a tremendous fire of musketry opens from the whole line; staff-officers are galloping down hurry-skurry from the camp. Far away above us, on those dark heights, the whole army will be under arms in ten minutes. The Russian column wavers once more—breaks like some wave against a sunken rock; dark flitting figures are seen to come out, and stagger, and fall; and then the whole body goes to the right-about and returns within its defences, just as a mass of heavy clouds rising from the Black Sea sweeps across the moon, and darkness covers once more besiegers and besieged.

We may lie down in peace now till the first blush of dawn rouses the riflemen on each side to that sharpshooting practice of which it is their custom to take at least a couple of hours before breakfast. We may choose the softest spots in those dusty covered ways,

and lean our backs against gabions that are getting sadly worn out, and in their half-emptied inefficiency afford but an insecure protection even from the conical ball of the wicked "Minié." We may finish our flasks of brandy-and-water and our bottles of cold tea, and get a few winks of sleep, and dream of home and the loved ones that, except in the hours of sleep, some of us will never see more. All these luxuries we may enjoy undisturbed. We shall not be attacked again, for this is what the soldiers term "A *quiet* night in the trenches."

CHAPTER XXXVIII.—THE GROTTO.

It is not *all* fighting, though, before Sebastopol. Without coinciding entirely with the somewhat Sancho Panza-like philosophy, which affirms that the "latter end of a feast is better than the beginning of a fray," there is many a gallant fellow who has not the slightest objection to take his share of both; and from the days of Homer's heavy-handed heroes, down to those of the doughty Major Dugald Dalgetty himself, a good commissariat has always been considered essential to the success of all warlike enterprise. Every campaigner knows what a subject of speculation and excitement is afforded by the prospect of "what he will have for dinner," and the scantiness of that meal, together with the difficulty of providing for it, seems but to add to the zest with which it is enjoyed. Many a quaint incident and laughable anecdote is related of the foraging propensities of our allies, particularly the Zouaves, who had learned their trade in Algeria, and profited by the lessons of their Khabyle foe. The Frenchman, moreover, knows how to *cook* a dinner *when* he has filched it, which is more than can be said for our own gallant countrymen.

Had it not been for Fortnum and Mason—names which deserve to be immortalized, and which will ever be remembered with gratitude by the British army—our heroes would indeed have been badly off for luxurious living on that bracing and appetite-giving plateau. Yet, thanks to the energy of this enterprising firm, Amphitryons were enabled to indulge their taste for hospitality, and guests to admire and criticise the merits of the very commendable delicacies placed before them.

A dinner-party at Sebastopol, just out of cannon-shot, had something inexpressibly enlivening in its composition. There was no lack of news, no lack of laughter, no lack of eatables and drinkables, above all, no lack of hunger and thirst. The same faces were to be seen around the board that might have been met with at any dinner-table in London, but white neck-cloths and broadcloth had given place to tawny beards and tarnished uniforms, whilst the bronzed countenances and high spirits of the party formed an exhilarating contrast to the weary looks and vapid conversation which make London society, in its own intrinsic attractions, the stupidest thing in the world.

The sun's last rays are lighting up that well-known hill where sleeps "the bravest of the brave," he whose name will go down to our children's children coupled with Inkermann, as that of Leonidas with Thermopylæ. He whose fall evoked a deed of chivalry such as minstrel and troubadoor snatched from oblivion in the olden time, and handed down to us for a beacon along the pathway of honor. Had they ever a nobler theme than this? A chief falls, surrounded and overpowered, in his desperate attempt to retrieve the fortunes of a day that he deems all but lost. His friend and comrade, faint and mangled, turns once more into the battle, and bestrides the form of the prostrate hero. One to ten, the breathless and the wounded against the fresh and strong, but the heart of an English gentleman behind that failing sword, beat down and shattered by the thirsty bayonets. An instant the advance is checked. An instant and they might both have been saved. O for but one half-dozen of the towering forms that are even now mustering to the rescue! They are coming through the smoke! Too late—too late! the lion-hearted chieftain and the gentle, chivalrous warrior are down, slain, trampled, and defaced, but side by side on the bed of honor; and though the tide sweeps back, and the broken columns of the Muscovite are driven, routed and shattered, to the rear, *their* ears are deaf to the shout of victory, *their* laurel wreaths shall hang vacant and unworn, for they shall rise to claim them no more.

The setting sun is gilding their graves—the white buildings of Sebastopol smile peacefully in his declining rays—the sea is blushing violet under the rich purple of the even-

ing sky. The Allied fleets are dotted like sleeping wild-fowl over the bosom of the deep; one solitary steamer leaves its long dusky track of smoke to form a stationary cloud, so smooth is the water that the ripple caused by the sunken ships can be plainly discerned in the harbor, and the Russian men-of-war still afloat look like children's toys in the distance of that clear, calm atmosphere. The bleak and arid foreground, denuded of vegetation, and trampled by a thousand foot-marks, yet glows with the warm orange hues of sunset, and the white tents contrast pleasingly with here and there the richer coloring of some more stationary hut or storehouse. It is an evening for peace, reflection, and repose; but the dull report of a 68-pounder smites heavily on the ear from the town, and a smart soldier-servant, standing respectfully at "attention" observes "The General is ready, sir, and dinner is upon the table."

In a grotto dug by some Tartar hermit out of the cool earth are assembled a party of choice spirits, who are indeed anchorites in nothing but the delight with which they greet the refreshing atmosphere of their banqueting-hall. A flight of stone steps leads down into this well-contrived vault, in so hot a climate no contemptible exchange for the stifling interior of a tent, or even the comparative comfort of a wooden hut thoroughly baked through by the sun. A halting figure on crutches is toiling painfully down that staircase, assisted, with many a jest at their joint deficiences, by a stalwart, handsome Guardsman, a model of manly strength and symmetry, but lacking what he is pleased to term his "liver wing." They are neither of them likely to forget the Crimea whilst they live. Ere they reach the bottom they are overtaken by a cavalry officer with jingling spurs and noisy scabbard, who, having had a taste of fighting, such as ought to have satisfied most men, at Balaclava, is now perpetually hovering about the front, disgusted with his enforced idleness at Kadikoi, and with a strong impression on his mind—which he supports by many weighty arguments—that a few squadrons of Dragoons would be valuable auxiliaries to a storming party, and that a good swordsman on a good horse can "go any where and do any thing."

"I think we are all here, now," says the host; "Monsieur le Général, shall we go to dinner?"

The individual addressed gives a hearty affirmative. He is a stout, good-humored looking personage, with an eagle eye, and an extremely tight uniform covered with orders and decorations. He is not yet too fat to get on horseback, though the privations of campaigning seem to increase his rotundity day by day, and he expects ere long to go to battle, like an ancient Scythian, in his war-chariot. By that time he will be a marshal of France, but meanwhile he pines a little for the opera, and enjoys his dinner extremely. He occupies the seat of honor on the right hand of his host. The latter bids his guests welcome in frank, soldier-like style; and whilst the soup is handed round, and those bearded lips are occupied with its merits, let us take a look round the table at the dozen or so of guests, some of whom are destined ere long to have their likenesses in every print-shop in merry England. First of all the dinner-giver himself—a square, middle-sized man, with a kindling eye, and a full determined voice that suggests at once the habit of command—a kindly though energetic manner, and a countena ce indicative of great resolution and clear-headedness; perhaps the best drill in the British army, and delighting much in a neat touch of parade tactics even before an enemy. Many a Guardsman nudged his comrade with a grin of humorous delight when, on a certain 20th of September, his old colonel coolly doubled a flank company in upon the rear of its battalion, and smiled to see the ground it would otherwise have occupied ploughed and riddled by the round shot that was pouring from the enemy's batteries in position on the heights above the Alma. The British soldier likes coolness above all things; and where in command of foreign troops an officer should rave and gesticulate and tear his hair to elicit a corresponding enthusiasm from his men, our own phlegmatic Anglo-Saxons prefer the quiet smile and the good-humored "*Now*, my lads!" which means so much.

On the left, and facing the Frenchman, sits a middle-aged decided-looking man, somewhat thoughtful and abstracted, yet giving his opinions in a clear and concise manner, and with a forcible tone and articulation that denote great energy and firmness of character. His name, too, is destined to fill the page of history—his future is bright and glowing before him, and none will grudge

his honors and promotion, for he is endeared to the army by many a kindly action, and it has been exertion for their welfare and watching on their behalf, that have wasted his strong frame with fever, and turned his hair so grey in so short a time. Soldier as he is to his heart's core, he would fain be outside in the sunset with his colors and his sketch-book, arresting on its pages the glorious panorama which is even now passing away; but he is listening attentively to his neighbor a handsome young man in the uniform of a simple private of Zouaves, and is earnestly occupied in "getting a wrinkle," as it is termed, concerning the interior economy and discipline of that far-famed corps. The Zouave gives him all the information he can desire with that peculiarly frank and fascinating manner which is fast dying out with the *ancien régime*, for though a private of Zouaves he is a marquis of France, the representative of one of the oldest families in the Empire, and a worthy scion of his chivalrous race. Rather than not draw the sword for his country, he has resigned his commission in that body of household cavalry termed "The Guides," and entered as a trooper in the Chasseurs d'Afrique: a display of martial enthusiasm for which he has been called out from the ranks of his original corps and publicly complimented by the Empress Eugénie herself. Arrived in the Crimea, he found his new comrades placed in enforced idleness at far too great a distance from active operations to suit his taste, and he forthwith exchanged once more into the Zouaves, with whom he took his regular share of duty in the trenches, and he is now enjoying a furlough of some six hours from his quarters, to dine with an English general, and cultivate the *entente cordiale* which flourishes so vigorously on this Crimean soil. Alas for the gallant spirit, the graceful form, the warm noble heart! no bird of ill omen flew across his path as he came to-day to dinner, no warning note of impending death rang in his ears to give him notice of his doom. To-night he is as gay, as lively, as cheerful as usual; to-morrow he will be but a form of senseless clay, shot through the head in the trenches.

Meanwhile the champagne goes round, and is none the less appreciated that although there is an abundance of bottles, there is a sad deficiency of glasses. A light-hearted aide-de camp, well accustomed to every emergency, great or small, darts off to his adjoining tent, from which he presently returns, bearing two tin cups and the broken remains of a coffee-pot; with these auxiliaries dinner progresses merrily, and a fat turkey —how obtained it is needless to inquire—is soon reduced to a skeleton. A little wit goes a long way when men are before an enemy; and as the aide-de-camp strongly repudiates the accusation of having purloined this hapless bird, jokes are bandied about from one to another, every one wishing to fasten on his neighbor the accusation of knowing how to "make war support war."

The English officers are a long way behind their allies in this useful accomplishment; and the French general shakes his jolly sides as he relates with much gusto sundry Algerian experiences of what we should term larceny and rapine, but which his more liberal ideas seem to consider excusable, if not positively meritorious.

"The best foragers I had in Algeria," says he, "were my best soldiers too. If I wanted fresh milk for my coffee, I trusted to the same men that formed my storming parties, and I was never disappointed in one case or the other. In effect, they were droll fellows, my Zouaves Indigènes—cunning too, as the cat that steals cream; the Khabyles could keep nothing from them. If we entered their tents, every thing of value was taken away before you could look round. To be sure we could carry nothing with us, but that made no difference. I have seen the men wind shawls round their waists that were worth a hundred louis a-piece, and throw them aside on a hot day on the march. There was one Khabyle chief who was very conspicuous for the magnificent scarlet cashmere which he wore as a turban. On foo or on horseback, there he was, always fighting and always in the front. Heaven knows why, but the men called him Bobouton, and wherever there was a skirmish Bobouton was sure to be in the thick of it. One day I happened to remark 'that I was tired of Bobouton and his red shawl, and I wished some one would bring me the turban and rid me of the wearer.' A little swarthy Zouave, named Pépé, overheard my observation. "*Mon Colonel*," said he, with a most ceremonious bow, 'to-morrow is your *jour de fete*—will you permit me to celebrate it by presenting you with the scarlet turban of

Bobouton?' I laughed, thanked him, and thought no more about it.

"The following morning, at sunrise, I rode out to make a reconnaissance. A party of whom Pépé was one, moved forward to clear the ground. Contrary to all discipline and *ordonnance*, my droll little friend had mounted a magnificent pair of epaulettes. Worn on his Zouave uniform, the effect was the least thing ridiculous. As I knew of no epaulettes in the camp besides my own, I confess I was rather angry, but the enemy having opened a sharp fire upon my skirmishers, I did not choose to sacrifice an aide-de-camp by bidding him ride on and visit Pépé with condign punishment; so reserving to myself that duty on his return, I watched him meanwhile through my glass with an interest proportioned to my regard for my epaulettes, an article not too easily replaced in Algeria. Nor were mine the only eyes that looked so eagerly on the flashing bullion. Bobouton soon made his appearance from behind a rock, and by the manner in which he and Pépé watched and, so to speak, 'stalked' each other, I saw that a regular duel was pending between the two. In fine, after very many manœuvres on both sides the Zouave incautiously exposed himself at a distance of eighty or ninety paces, and was instantaneously covered by his watchful enemy. As the smoke cleared away from the Khabyle's rifle, poor Pépé sprang convulsively in the air, and fell headlong on his face. '*Tenez!*' said I to myself, "there is Pépé shot through the heart, and I shall never see my epaulettes again.'

"The Khabyle rushed from his hiding-place to strip his fallen antagonist. Already his eyes glittered with delight at the idea of possessing those tempting ornaments—already he was within a few feet of the prostrate body, when, "crack!" once more I heard the sharp report of a rifle, and presto, like some scene at a carnival, it was Bobouton that lay slain upon the rocks, and Pépé that stood over him and stripped him of the spoils of war. In another minute he unrolled the red turban at my horse's feet. '*Mon Colonel*,' said he, 'accept my congratulations for yourself and your amiable family. Accept also this trifling token of remembrance taken from that incautious individual who, like the mouse in the fable, thinks the cat must be dead because she lies prostrate without moving. And accept, moreover, my thanks for the loan of these handsome ornaments, without the aid of which I could not have procured myself the pleasure of presenting my worthy colonel with the shawl of *ce malheureux Bobouton*.' The rascal had stolen them out of my tent the night before, though my aide-de-camp slept within two paces of me, and my head rested on the very box in which they were contained."

"Alas! we have no experiences like yours, General," says a tall, handsome colonel of infantry, with the Cape and Crimean ribbons on his breast; "wherever we have made war with savages, they have had nothing worth taking. A Kaffre chief goes to battle with very little on besides his skin, and that is indeed scarce worth the trouble of stripping. When we captured Sandilli, I give you my word he had no earthly article upon his person but a string of blue beads, and yet he fought like a wild-cat to make his escape."

"Your health, my friend," replies the General, clinking his glass with that of his new acquaintance. "You have been in Caffraria? Ah! I should have known it by your decorations. Are they not a fierce and formidable enemy? Is it not a good school for war? Tell me, now"—looking round the table for an explanation—"why do you not reserve South Africa, you others as we do the northern shore, to make of it a drill-ground for your soldiers and a school for your officers? It would cost but little—a few hundred men a year would be the only loss. Bah!—a mere trifle to the richest and most populous country in the world. I do not understand your English *sang froid*. Why do you not establish *your* Algeria at the Cape?"

Many voices are immediately raised in explanation; but it is difficult to make the thorough soldier—the man who has all his life been the military servant of a military Government—understand how repugnant would be such a proceeding to the feelings of the British people—how contrary to the whole spirit of their constitution. At length, with another glass of champagne, a new light seems to break in upon him. "Ah! says he, "it would not be approved of by *Le Times*; now I understand perfectly. We manage these matters better with us. *Peste!* if we go to war, there it is. We employ our *Gazettes* to celebrate our victories. Your

health, *mon Général*; this is indeed a wearisome business in which we are engaged—a life totally brutalizing. Without change, without manœuvring, and without pleasure; what would you? I trust the next campaign in which we shall meet may be in a civilized country—the borders of the Rhine, for instance; what think you?—where instead of this barbarian desert, you find a village every mile, and a good house in every village, with a bottle of wine in the cellar, a smoked ham in the chimney, and a handsome Saxon *blonde* in the kitchen. "*A la guerre, cymme à la guerre, n'est ce pas, mon Général?*"

The company are getting merry and talkative; cigars are lit and coffee is handed round; the small hours are approaching, and what Falstaff calls the "sweet of the night" is coming on, when the tramp and snort of a horse are heard at the entrance of the grotto, —a steel scabbard rings upon the stone steps—and although the new-comer's place at one end of the table has been vacant the whole of dinner-time, he does not sit down to eat till he has whispered a few words in the ear of the English general, who receives the intelligence with as much coolness as it is imparted.

In five minutes the grotto is cleared of all save its customary occupants. The French general has galloped off to his head-quarters; the English officers are hurrying to their men; each as he leaves the grotto casts a look at an ingenious arrangement at its mouth, which, by means of a diagram formed of white shells, each line pointing to a particular portion of the attack, enables the observer to ascertain at once in which direction the fire is most severe. The originator of this simple and ingenious indicator meanwhile sits down for a mouthful of food. He has brought the intelligence of the sortie already described, and which will turn out the troops of all arms in about ten minutes; but in the mean time he has five to spare, and being very hungry he makes the best use of his time. As the light from the solitary lamp brings into relief that square, powerful form—that statue-like head, with its fearless beauty and its classical features—above all the frank, kindly smile that never fades under difficulties, and the clear, unwavering eye that never quails in danger,—any physiognomist worthy of the name would declare "that man was born to be a hero!" And the physiognomist would not be mistaken.

An Hour on the First Sugar Estate in Massachusetts.—A few days since we had the pleasure of visiting the *first sugar estate*, as we believe, *in Massachusetts*, and of witnessing the operations of squeezing the cane and boiling the juice, and seeing it put into barrels for market. The pioneer in this laudable enterprise is J. F. C. Hyde, Esq., of Newton Centre, Mass., the gentleman who prepared the manual on the cultivation of the sugar-cane which was published and extensively circulated last spring.

On reaching the scene of operations we found Mr. Hyde, and four or five other persons, actively engaged in the work necessary to obtain syrup; they were aided by a powerful pair of horses, who found the labor quite severe in turning the ponderous cast-iron rollers which were squeezing the very life blood out of the canes. There were also three boilers, from forty to seventy gallons in capacity, over an arch, and under them a roaring fire. With these complete arrangements, Mr. Hyde will be able to extract nearly all the juices from the canes, and to learn what their product is, and also what cane produces the largest amount of juice as well as of saccharine matter. He had already ascertained that cane grown on rather low, rich land, did not produce juice so rich and sweet as that grown on land rather dry and warm. This point he will be able satisfactorily to establish, as cane is brought to him to be pressed from various localities and cultivated under a variety of circumstances. He had also learned that the canes are sweetest near the ground, and that some three or four feet of the top contains very little saccharine matter.

Mr. Hyde had been so fortunate as to obtain the services of Mr. Williams to aid him in boiling down the juice; he having had some dozen years' experience in that business on the sugar plantations of Cuba. Mr. Williams arrived at the boiler-house at the time we did, and his practised eye soon detected errors in the operations which might have frustrated all Mr. Hyde's efforts. The fire was soon regulated, the skimmer put in requisition, and soon a gold-colored foam spread over the contents of the kettles, and all was progressing properly. Various tests soon caused Mr. Williams to say that "he believed it would grain," but we left before that important point was decided. The mill used for grinding or pressing the cane is so powerful as to leave it so dry as to allow it to be used for fuel, after a few hours exposure to the sun. The juice obtained gives about *one-seventh* of its bulk in syrup, which is thick, sweet, clear, and has a slightly peculiar, but pleasant taste. We have tried it in various ways, and think it would be generally esteemed for the table and cooking purposes, after a little use.—*N. E. Farmer.*

A BRITISH OFFICER ARRAIGNED FOR PREACHING TO THE HEATHEN IN INDIA.

CORRESPONDENCE BETWEEN COL. WHELER AND HIS GOVERNMENT.

The Secretary to the Government of India to Major-General Hearsey.

FORT WILLIAM, April 3, 1857.

Sir: Rumors having reached government that Col. S. G. Wheler, commanding the 34th regiment Native Infantry, has of late held language to the men of his regiment, indicating that it was his expectation that they would, sooner or later, be converted to Christianity, and that he has lately addressed them on religious subjects, I am instructed to request that you will state, for the information of government, whether you are cognizant of any reports to the same effect, and whether you have reason to believe that there is any truth in them. I have, &c.

R. J. H. BIRCH, Colonel.

Major-General Hearsey to the Secretary to the Government of India.

BARRACKPORE, April 6, 1857.

Sir: In compliance with the directions contained in your official letter to my address, dated the 3d instant, I have the honor to forward herewith, for submission to government, letters in original from Brigadier C. Grant, C. B., and Brevet Colonel Wheler, commanding the 34th Regiment Native Infantry, in which replies are given to the question put by you as to the reports affecting the conduct of the last-named officer.

I beg to add, that my residence at this station has been so short that I have no knowledge whatever of the truth, or otherwise, of the rumors referred to, though I am well aware that such are prevalent and generally credited. I have, &c.

J. B. HEARSEY, Major-General,
Commanding Presidency Division.

Brigadier Grant to the Assistant Adjutant-General, Presidency Division.

BARRACKPORE, April 6, 1857.

Sir: I have the honor to forward Colonel Wheler's (34th Regiment Native Infantry) reply to Colonel Birch's letter of the 5th April.

I beg to state, that when the disaffection first made its appearance among the sepoys at Barrackpore, Colonel Wheler reported his having addressed the men of his regiment on parade on the subject of religion, and as well as I can recollect nearly as follows:

That the British government did not interfere with the religion of its servants, and never had done so. He then explained that no person could be made a Christian by force, as it was first of all necessary to understand and give your assent to the Christian religion before anybody could become a Christian.

At this time the sepoys said that they heard that they were to be made Christians by force.

This is the only instance that I know of Colonel Wheler speaking to the sepoys on the subject of religion.

I have, &c.,
C. GRANT, Brigadier,
Commanding at Barrackpore.

Lieutenant-Colonel Wheler to the officiating Brigade Major, Barrackpore.

BARRACKPORE, April 4, 1857.

Sir: I have the honor to acknowledge the receipt of your letter dated the 4th instant, together with inclosures, with a request that I would afford the information called for, for transmission to government.

In reply to this very delicate subject, on which I hope I may be allowed to express my sentiments freely, since they involve what I consider as part of my conscientious duty towards my Heavenly Superior, I would beg to remark, in the first place, that there is no foundation whatever for my having held language to the men of my regiment, indicating that it was my expectation that they would, sooner or later, be converted to Christianity. To entertain such an expectation on right and solid grounds would afford me the highest gratification, both as regards my own regiment, the whole army, and every native in the country, as we should then no longer witness such opposition as has been lately manifested towards the government; all would be deeply impressed with principles of our religion, particularly as regards their conduct to their superiors, as laid down in the first part of the 13th chapter of Romans.

With regard to my having addressed the sepoys on religious subjects, I beg to state that during the last twenty years and upwards I have been in the habit of speaking with the natives of all classes, sepoys and others, making no distinction, since there is no respect of persons with God, on the subject of our religion, in the highways, cities, bazars, and villages, (not in the lines and regimental bazars.) I have done this from a conviction that every converted Christian is expected, or rather commanded, by the Scriptures, to make known the glad tidings of salvation to his lost fellow-creatures, our Saviour having offered himself up as a sacrifice for the sins of the whole world, by which alone salvation can be secured. He has directed that this salvation should be freely offered to all, without exception.

Should any native, sepoy, or other, come to me earnestly soliciting instruction in the truths of our religion, I should consider myself bound to afford it to the best of my abil-

ity. To refuse such a request I should incur the displeasure of the Almighty.

I have, &c.,

S. G. WHELER, Lieutenant-Colonel,
Commanding 34th Regiment Native Infantry.

Minute by the Governor-General of India.

When the Secretary's letter of the 3d instant was written, it was not intended that the inquiry therein made of Major-General Hearsey, as to the practice attributed to Lieutenant-Colonel Wheler of speaking to the men of his regiment on religious subjects, should be addressed to Lieutenant-Colonel Wheler himself. This, however, has been done by Major-General Hearsey, and I see no reason to regret it.

In his reply, Lieutenant-Colonel Wheler frankly states that he has been in the habit of speaking to natives of all classes, sepoys and others, making no distinction, on the subject of the Christian religion. The only distinction which he describes himself as having observed is, that he has not done this in the lines or regimental bazars.

It does not appear whether Lieutenant-Colonel Wheler has been in the habit of addressing the sepoys of his own regiment, as well as those of other regiments, upon religious matters. Nothing to the contrary is said by him, but the question is an important one, having regard to recent proceedings in the rank of the 34th Regiment Native Infantry, and to the present temper of that corps, and it is desirable that the answer to it should be clear.

I propose, therefore, that Major-General Hearsey be directed to ascertain from Lieutenant-Colonel Wheler whether, in speaking to sepoys on the subject of the Christian religion, he has spoken to any of the sepoys of the regiment which he commands, as well as to others.

April 10, 1857.	CANNING.
April 11, 1857.	J. DORIN.
April 11, 1857.	J. LOW.
April 11, 1857.	J. P. GRANT.
See separate minute.	B. P.

Minute by Mr. Peacock, dated April 11, 1857.

The last paragraph of Colonel Wheler's letter appears to leave it rather ambiguous whether or not he intends it to be understood that he has not spoken to sepoys or other natives, upon the subject of Christianity except when they have come to him and solicited instructions as to the truths of that religion. The expression of what he should consider to be his duty in future, seems to be intended to reflect some light upon what he admits himself to have been in the habit of doing for the last twenty years. I think it will be advisable to avoid all doubt, by directing Major-General Hearsey to ascertain from Colonel Wheler, in addition to the information suggested by the Governor-General, whether he intends it to be inferred, from the last paragraph of his letter, that he has not spoken to any sepoys upon the subject of the Christian religion except when they have solicited instruction in the truths of that religion, and whether he has or has not volunteered his opinions and advice upon the subject of the Christian religion to any of the sepoys of the 34th Native Infantry, either collectively or individually, since that regiment has been commanded by him, and to other sepoys in the same cantonment, and endeavored to convert them to Christianity, either by exhorting them to embrace that religion, or by pointing out that their own religion is false, or otherwise; and if not, what has been the nature of his conversation with the sepoys to whom he has spoken upon the subject of our religion.

This will prevent all doubt as to the nature of the conversation, although I think it clear that Colonel Wheler intends to admit that he has spoken to the sepoys by way of instruction or exhortation, and not in the sense referred to by Brigadier Grant.

I do not intend to impute to Colonel Wheler that he has intentionally left any ambiguity in his answer; on the contrary, I think he has answered as might be expected from him—in a fair and straightforward manner.

I merely make this suggestion because I think it will be well to avoid all doubt in the event of its becoming necessary to act upon the answer. B. PEACOCK.

The Secretary to the Government of India to Major-General Hearsey.

FORT WILLIAM, April 13, 1857.

Sir: I am directed to acknowledge the receipt of your letter of the 6th instant, forwarding one from Colonel Wheler, commanding the 34th Regiment Native Infantry, in which that officer frankly states that he has been in the habit of speaking to natives of all classes, sepoys and others, making no distinction, on the subject of our religion. The only restriction which he describes himself as having observed, is that he has not done this in the lines or regimental bazars.

2. It does not appear whether Colonel Wheler has been in the habit of addressing the sepoys of his own regiments, as well as those of other regiments, upon religious matters. Nothing to the contrary is said by him; but with reference to recent proceedings in the ranks of the 34th Regiment Native Infantry, and to the present temper of the corps, the question is an important one, and it is desirable that the answer to it should be clear.

3. I am, therefore, desired to request that you will call upon Colonel Wheler to state

whether, in speaking to sepoys on the subject of our religion, he has spoken to any of the sepoys of the 34th regiment, which he commands, as well as to others; and, with reference to the concluding paragraph of his letter, whether he intends it to be inferred that he has not spoken to any sepoys upon the subject of the Christian religion, except when they have solicited instruction in the truths of that religion; and whether he has or has not volunteered his opinion and advice upon the subject of the Christian religion to any of the sepoys of the 34th Regiment Native Infantry, either collectively or individually, since that regiment has been under his command, and to other sepoys in the same cantonment, and endeavored to convert them to Christianity, either by exhorting them to embrace that religion, or by pointing out that their own religion is false or otherwise; and, if not, what has been the nature of his conversation with the sepoys to whom he has spoken upon the subject of our religion.

4. The Governor-General in Council does not impute to Colonel Wheler that he has intentionally left any ambiguity in his answer; on the contrary, his lordship in Council thinks that he has answered as might be expected from him, in a fair straightforward manner, but it is desirable that all doubt should be removed, and it is with this view that this further inquiry is made. I am, &c.,

R. J. H. BIRCH, Colonel.

Major-General Hearsey to the Secretary to the Government of India.

BARRACKPORE, April 16, 1857.

Sir: As directed in your dispatch dated the 13th instant, I have the honor to forward herewith, for submission to government, a second letter in original of yesterday's date, from Brevet Colonel S. G. Wheler, commanding the 34th Regiment Native Infantry, affording a further explanation respecting his conduct, as required by you. I have, &c.,

J. B. HEARSEY, Major-General,
Commanding Presidency Division.

Lieutenant-Colonel Wheler to the assistant Adjutant-General, Presidency Division.

BARRACKPORE, April 15, 1857.

Sir: I have the honor to acknowledge the receipt of your memorandum of yesterday's date, requesting me to afford the fullest information in my power relating to the subject-matter of the letter dated Council Chamber, Fort William, the 13th of April, 1857, from Colonel Birch, Secretary to the government of India, Military Department, and addressed to Major-General Hearsey, C.B., commanding the Presidency Division. In reply to this second communication, I would beg to express my regret that I did not explain myself so explicitly, or afford so full an explanation, as was expected in my first answer, as regards my addressing the sepoys and others on the subject of religion. I would now, therefore, beg to state that it has been my invariable plan to act on the broad line which Scripture enforces, that is, to speak without reserve to every person; when I therefore address natives on this subject, whether individually or collectively, it has been no question with me as to whether the person or persons I addressed belong to this or that regiment, or whether he is a shopkeeper, merchant, or otherwise, but speak to all alike, as sinners in the sight of God; and I have no doubt that I have often, in this way (indeed, I am quite certain) addressed sepoys of my own regiment, as also of other regiments at this and other stations where I have been quartered. I have told them plainly that they are all lost and ruined sinners both by nature and by practice, like myself, that we can do nothing to save ourselves in the way of justifying ourselves in the sight of God; our hearts being sinful, all our works must consequently be sinful in His sight, and therefore there can be no salvation by works, on which they are resting and depending. The justice of God demands an infinite punishment for sin; and there is but one way in which guilty man can stand just before God, who is infinite in holiness and purity, and that is by believing and embracing the sacrifice made for sin by Jesus Christ, the Son of God; in this way and only this, can the sinner become reconciled to an offended God, and this salvation is freely offered to Hindoos, Mussulmans, and every denomination of men in the whole world. These have constituted the leading points which I have generally endeavored to bring to their notice, and which in declaring them leads to various interesting questions as to the efficacy of their own works of washing in the Ganges, proceeding on pilgrimage, worshipping all kinds of creatures instead of the Creator, and other methods of man's invention, all of which I endeavor to answer according to the spirit and principle laid down in the Scripture of truth, the standard by which alone we can meet all their arguments. As to the question whether I have endeavored to convert sepoys and others to Christianity, I would humbly reply that this has been my object, and I conceive is the aim and end of every Christian who speaks the word of God to another, namely that the Lord would make him the happy instrument of converting his neighbor to God, or, in other words, to rescue him from everlasting destruction; and if there is joy in heaven over one sinner that repenteth (whether sepoy or other), should not the instrument of that person's conversion join in rejoicing likewise. Such, I feel confident, would be the feelings of every commanding

officer being an experienced Christian, whereas the very opposite would take place in the feelings of one who never studied the subject and therefore possessed no deepened views of spiritual religion; the fear of man would then preponderate, and the very idea of a sepoy of his regiment becoming a true convert to Christianity would, if I mistake not, so far from rejoicing at the event, set him trembling from head to foot with fear, and thus it will ever be when the fear of God is found wanting in the heart. On matters connected with religion, I feel myself called upon to act in two capacities—"to render unto Cæsar (or the government) the things that are Cæsar's, and to render unto God the things that are God's." Temporal matters and spiritual matters are in this passage clearly placed under their respective heads. When speaking, therefore, to a native upon the subject of religion, I am then acting in the capacity of a Christian soldier under the authority of my Heavenly Superior; whereas in temporal matters I act as a government officer under the authority and orders of my earthly superior. In carrying out these duties towards my Heavenly Superior, I am reminded by the Saviour that I must count the cost and expect to meet persecution; to be brought before Kings and Rulers for His sake; to be condemned by the world and all around me: but His favor and protection is promised, and grace and strength in every time of trouble and difficulty, and a rich reward hereafter. I take shame to myself in having manifested such coldness and lukewarmness in the service of him who underwent the most agonizing and ignominious death, in order that he might fully atone for our guilt and sin.

In conclusion, I trust I shall be excused for having taken more liberty in speaking on this delicate subject than on another occasion.

I have, &c.

S. G. WHELER, Lieutenant-Colonel.
Commanding 34th Regiment Native Infantry.

Minute by the Governor-General.

The evidence taken by the courts-martial and Courts of Inquiry, which have been held upon the insubordinate and mutinous acts of certain native officers and sepoys of the 34th Regiment Native Infantry, imposes upon the Governor-General in Council the duty of considering the conduct pursued by the commanding officer of that corps in the course of the events disclosed by those investigations.

In respect to Colonel Wheler's proceedings, the following facts are already on record:

On the evening of the 29th of March, Colonel Wheler proceeded to the lines of his regiment, having been informed by one of his officers that a sepoy was parading in front of the line, inciting the men to mutiny.

On arriving there he saw the man walking up and down, armed, and was informed that the Adjutant and Sergeant-Mayor of the regiment had both been wounded in an attempt to secure him.

On reaching the quarter-guard, Colonel Wheler directed two or three men of the guard to load; but upon the suggestion of Captain Drury, who accompanied him, extended this order to all. He then directed the Jemadar to take the guard and secure the mutineer.

The Jemadar murmured, and Colonel Wheler thereupon repeated the order two or three times. What followed shall be told in Colonel Wheler's own words:

"He (the Jemadar) at last ordered the guard to advance; they did so, six or eight paces, and halted. The native officer returned to me, stating that none of the men would go on; I felt it was useless going on any further in the matter. Some one, a native in undress, mentioned to me that the sepoy in front was a Brahmin, and that no one would hurt him. I considered it quite useless, and a useless sacrifice of life, to order an European officer with the guard to seize him, as he would, no doubt, have picked off the European officer without receiving any assistance from the guard itself. I then left the guard and reported the matter to the Brigadier."

All this is frankly stated by Colonel Wheler, and here his share in the transaction ends.

Major-General Hearsey, commanding the Presidency Division, then rode up, accompanied by his Aide-de-camp and others, and having ascertained that the muskets of the guard were loaded, ordered the Jemadar and sepoys of the guard to follow him. They did so, and he led them forward against the mutineer, who, upon their drawing near, shot himself.

This is the substance of all that appears in evidence regarding Colonel Wheler's conduct and the motives of it. Were it necessary to come to an opinion upon this evidence alone, I could come to none more favorable to Colonel Wheler than that he is entirely unfit to be entrusted with the command of a regiment.

But the occasion is so grave, and the misconduct of Colonel Wheler bears *prima facie*, so serious an aspect, that I do not think that any decision upon that officer's case will be satisfactory which is not founded upon a full inquiry specially directed to his conduct: giving him, of course, opportunity of explanation and defence. No such inquiry has yet been had, Colonel Wheler having appeared in Court on each occasion, either as prosecutor or witness.

I therefore propose that the Commander-in-Chief be requested to submit the conduct of Colonel Wheler on the 29th of March, to an investigation by court martial, or to such other investigation as his Excellency may think proper. Before the proceedings of the courts martial and Courts of Inquiry on the 34th regiment came before the government, the conduct of Colonel Wheler in another matter not immediately connected with the events of the 29th of March, but materially affecting his fitness for military command, had been the subject of inquiries addressed by order of the government to Colonel Wheler himself. I allude to the rumors which reached the government, that Colonel Wheler had lately addressed the men of his regiment on religious subjects.

Colonel Wheler's answers were not satisfactory: but I do not propose to submit this part of his conduct to investigation by a military court although I reserve to myself full liberty to deal with it hereafter.

April, 9, 1857. CANNING.

Minute by Mr. Dorin.

I think it is essential to the cause of military order and discipline, that Colonel Wheler should be brought to trial by court martial for unsoldier-like conduct.

No one can place this conduct in a more unfavorable light than Colonel Wheler has done himself.

According to his practice, as admitted by his own evidence on the inquiry into the conduct of the quarter-guard of the 34th Native Infantry, the way to put down a mutiny in his regiment, taking place before his own eyes, is to say, as it were, to the native officers of the guard, "You go first, and I'll stand and look on; and if you won't go, then I'd rather do nothing because it is dangerous." It seems never to have occurred to Colonel Wheler to head the guard, because he was ordering it on a service of danger; a course that was immediately adopted by Major-General Hearsey, when he came on the ground after Colonel Wheler had left it to report to the Brigadier.

I am sure every soldier in the armies of British India would repudiate Colonel Wheler's doctrine and example on this occasion.

In my opinion, whatever may be the result of a court martial on Colonel Wheler, he has shown himself incompetent to command the 34th or any other regiment; and I would remove him at once from regimental command.

He has already been passed over as unfit for the Brigade Staff.

Sepoys are quick-sighted enough in understanding the character of their officers; and the fact that the quarter-guard and the whole of the men off duty in the line of his corps paid not the slightest attention to Colonel Wheler's, or any of his officers' orders, during the occurrences of the 29th of March, shows the sort of discipline he maintained in the regiment, and the estimation in which he was apparently held by his own men.

The whole evidence in these proceedings goes to prove the mutual distrust existing in the corps between officers and men. The commanding officer must necessarily be primarily responsible for this state of feeling, and, as regards the men under his command, it may reasonably be presumed that the distrust was not diminished by the fact, avowed by Colonel Wheler, that he has been in the habit of addressing them, in common with other native soldiers, on religious subjects, with a view to their conversion from their respective creeds.

Such conduct appears to me totally subversive of military discipline, and, conjointly with his other short-comings, to render Colonel Wheler unfit for regimental or any other military command. J. DORIN.

May 9, 1857.

Minute by Major-General Low, concurred in by Mr. Grant.

Before I had seen the proceedings of the Court of Inquiry into the misconduct of the quarter-guard of the 34th Native Infantry on the 29th of March last, and having regard only to Colonel Wheler's habitual and persevering personal endeavors to convert Hindoo and Mohammedan sepoys in our army to the Christian religion, it was my decided opinion that the dictates of a sound policy require that this officer shall be removed from the command of the 34th Regiment, and prevented from commanding any regimen composed of natives of India; and I need scarcely say that the behavior of Colonel Wheler on the 29th of March has given me a most cogent additional reason, although of a different kind, for adhering to that opinion.

I agree, however, with the Governor-General in the opinion that the conduct of Colonel Wheler, connected with that of the quarter-guard of the 34th Regiment should be dealt with quite separately from all other errors on his part, and that the decision on his behavior on the 29th of March ought to be founded upon a full inquiry, specially directed to that object, so that an opportunity may be given him for explanation and defence; and as his extraordinary errors (to apply the mildest possible term to his conduct) on that occasion were committed in his professional capacity of Commandant of the regiment to which that quarter-guard belonged, I also concur with the Governor-General in thinking that the

natural, and the most suitable, course in the present stage of these affairs for the government to follow, is to request the Commander-in-chief to have Col. Wheler's conduct on the 29th March last, submitted to the test, either of a court martial at once, or of such other formal investigation as his excellency may deem proper. J. Low.

May 11, 1857.

I entirely concur. J. P. Grant.

May 11, 1857.

Minute by Mr. Peacock.

I entirely agree. It appears to me that Colonel Wheler is open to the charge of not having used his utmost endeavors to suppress the mutiny commenced by Mungal Pandy. This was one of the charges upon which Issuree Pandy was tried and found guilty, Col. Wheler acting as prosecutor.

In his defence, Issuree Pandy says: "We advanced about twenty or twenty-five paces, when three sepoys spoke and said, 'What, are not the Colonel and Captain Drury coming?'"

Whether the statement was true or false, the question was not a very unnatural one.

If Colonel Wheler had insisted upon the guard doing its duty, and if he and Captain Drury had accompanied them, I do not think that they would have ventured to disobey orders.

Captain Drury, in his evidence, says, "Matters seemed to be getting so serious that I suggested to Colonel Wheler that I should go and try and get a rifle and shoot the man," and Captain Drury went accordingly to try and get one, from which I assume that Colonel Wheler assented to his suggestion. If he had succeeded and carried his intention into effect I think it would not have been a very soldierlike or dignified proceeding, or a very good example either to the quarter-guard or to the 300 or 400 sepoys who were looking on, but fortunately he met General Hearsey the result of whose proceedings is well known. It is to be remarked that, even when General Hearsey advanced with the guard, neither Colonel Wheler nor Captain Drury appears to have accompanied him, though they both saw him advance. B. Peacock.

May 11, 1857.

Comments of The N. Y. Evening Post, 31 Oct.

AN INTOLERANT TOLERATION OF PAGANISM.

Fortunately or unfortunately, England is under great temptation to be tolerant towards the religious prejudices of the Hindoos. It is almost the only condition upon which she holds, with a title no better than that of the strongest, a territory in the East larger and more populous than that of France, Spain, Italy and Germany put together, and the clear revenue of which has exceeded the present clear revenue of any state in the old world, France only excepted. It is easy therefore, to believe that the protestations of the English officials, that they do not mean to interfere with the religious institutions of the Hindoos, are perfectly sincere. Indeed, they have not escaped the suspicion of being a little too tolerant, and of having deliberately countenanced pagan practices for the purpose of strengthening their hold upon the confidence of the Indian people. Macaulay made such an excess of liberality the foundation of a motion in Parliament, in 1843, for the recall of Lord Ellenborough from the Governor-Generalship of India. He had aided in decorating their idolatrous temples and transporting native princes to worship at them. In the course of his speech in favor of the recall, Mr. Macaulay used the following language, which we quote as bearing with more or less correctness upon a more recent proceeding, which we are about to bring to the notice of our readers:

"Although we have not done any thing to put down their religion, and although in this we have acted most wisely, yet, sir, I am not sure that for some time a most dangerous and pernicious leaning has not been exhibited the other way. I believe we have done much to make the idolatrous practices a matter of national revenue. We long looked with jealousy on the labors of the Christian missionaries who went to India; we long looked too severely on the conduct of those whose labors were of no slight value; we tolerated too long the human sacrifice; we allowed too long the degrading practice of the Suttee, which might have been put down long ago were it not for our toleration. I believe that we made no attempt to protect the person or property of our fellow-creatures and our subjects against the demands of superstition. As far, too, as related to a great part of their idolatrous processions, and to the decoration of their temples, we lent our aid: we sent, under our escort, the native chiefs on their way to worship at those temples, and we thus marked our support of an idolatrous worship. We might have had an object in all this. I think it undignified even if it were not, under all considerations, most inexpedient in a temporal point of view, and as a temporal matter alone will I be tempted to discuss it. The inevitable effect on the people of India was to make them believe that we attached no importance to the

vast distinction between that religion, every work of which has always been, beyond all other religions, to advance knowledge and learning, to widen the field of domestic happiness, to promote and secure public and personal liberty, which *in the old world* has struck off the chains of slavery, which has everywhere raised the condition of women and assuaged the horrors of war; and that other religion, which we cannot sanction or support without committing an act of treason against civilization and against humanity."

While the Anglo-Indian government has been so tolerant of paganism in India, it may be doubted as Macaulay reiterates, whether it has been or even now is as tolerant of Christianity; whether it does not occasionally make up for its liberality towards the Brahmins by its severity towards the Missionaries. This question has acquired peculiar importance recently, in consequence of the alleged proselytising propensities of Col. S. G. Wheler, who has incurred the censure of the government by his attempts to convert the heathen soldiers under his command to Christianity. There is naturally great sensitiveness in India just now to any interference with the religious views of the natives, and any person detected in such interference exposes himself to be regarded as one of the causes of all the calamities which have recently befallen the English rule in that quarter. Col. Wheler has placed himself precisely in that position. He is evidently a man of moderate abilities, and perhaps something of a fanatic, but it is difficult to see what he has done to deprive him of the toleration which is so liberally extended to the religious teachers of Brahma. He has been court-marshalled, and though for a different offence than teaching his religion, it is pretty evident from the official correspondence, parts of which we publish in another column from the Parliamentary records, that the accusation was changed from motives of policy, and when upon reflection it came to be doubted whether England was prepared to cashier a soldier for attempting to convert the heathen sepoys to the Christian faith. This is further apparent from the fact that the Governor-General had actually communicated to the Home Government his intention to bring the Colonel's missionary propensities before a Court of Inquiry.

It is pretty clear that England cannot permit Colonel Wheler's conduct, as set forth in his letters of the 4th and 15th of April, foolish as it may have been in some respects, to be publicly censured, without ceasing to deserve the title of a Christian nation. Nor will she. And we do not doubt that the sudden change of front to which we have already referred, was a necessary concession to public sentiment. That his behavior when summoned to arrest the sepoy Mungal Pandy, who under the influence of Chang was parading in front of the lines inciting the men of his regiment to mutiny, was not what it should have been, may be admitted, though we can readily find an excuse for the course he took without impeaching his bravery. It is no part of the duty of an officer to expose himself or his men to the murderous weapon of an insane or drunken man, except to prevent immediate and irremediable damage, and it does not appear conclusively that either of these contingencies were imminent when the Colonel, without resorting to violent measures, reported the facts to the Brigadier. The result of the Colonel's trial has not yet transpired; when it does we may have occasion to recur to this subject; meantime we trust our readers will run their eyes over the correspondence which we copy elsewhere, and which may yet prove to be the germ of the future policy of England in India.

Same Subject in The Times 16 October.

THE Bishop of Oxford and Mr. Gladstone have spoken upon Indian affairs in a manner that shows what we are to expect when Parliament meets and the discussion begins. As men of religious convictions, they reprobate the "timidity" of a system which can no longer claim even the shallow plea of success, and which has not escaped the charge of that proselytism which for a century it has done its utmost to avoid. Indifference is bad, irreligion is worse; but worse still is a religion which, not content with letting others alone, crushes its friends, lest it should offend its foes, and is thus continually betraying its own interests and belying its own truth. At home we have often deplored a policy which English people were told was no concern of theirs, and which they were wholly unfit to pronounce upon. So the Bishop of Oxford and Mr. Gladstone represent the feeling of their country, and display at the same time the tact of practised orators, when they address themselves to the two flagrant facts of Anglo-

Indian dread of Christian zeal, and Indian mutiny. If there is not a necessary connexion between these two facts, and if the mutiny is to human eye rather in spite of our precautions than in consequence of them, it is the fault of the Anglo-Indian Government that we cannot help associating these two things. Those of us who are old enough can remember what the Bishop of Oxford states with much force, that the East India Company (for there was a company in those days) steadily resisted the invasion of Christianity, step by step into their unhallowed soil. They fought hard first against the admission of missionaries, then against regular chaplains, then against a Bishop; and when poor Bishop Middleton went at last he landed, lived, worked, and died under a constant unrelenting protest by the authorities, who were determined to show the natives that they had nothing to do with him. The present position of a Bishop in India, such as it is, we owe to the great abilities and singularly engaging qualities of Heber. The other incidents alluded to by the Bishop of Oxford have already been brought before our readers; and, though the single instance of a Christian Sepoy being deprived of his place in his regiment, and sent to vegetate on his pay, proves rather the narrowness than the extent of the actual persecution, it is exceedingly significant. One case is enough in such matters, and is quite conclusive as to the line taken by the authorities. But what is the occasion of instances, when the general practice is admitted, defended, and even now tickled for? This is the most prominent topic of the Bishop's speeches at Chester, and in laying so much stress upon it he is only taking up a cause opened by his father more than seventy years ago. The "timidity" complained of is constitutional, beginning with the infancy of the Company. The best comment on it is the mutiny of the whole Bengal Army on a caste plea. What avail our precautions? To stifle Heaven-sent doctrines and to shut up good tidings intended for the whole world is bad enough. But it has been done in vain. The sin has been committed without obtaining its reward. As the hired assassin, instead of getting his money, is often put out of the way, so the Anglo-Indian Government has not even the consolation of a profitable wrong. For anything it has got it might as well have been Christian.

Neither the Bishop, however, nor Mr. Gladstone has attempted to get at the real mystery of the affair, and the most important part of the question, which is our actual religious position in India and the religious aspect in the eyes of the native. We much doubt whether "timidity," or a fear of bringing down a religious reaction, is a full account of the matter. But is there any doubt about it? There is nothing in the way of moral phenomena so distinct, so pronounced, so obvious to the apprehension, as the religious tone of Indian politicians. Old and young, civilians or soldiers, however much they may disagree on minor points, are generally agreed on taking a most amiable view of Hindooism, Mahomedanism, idolatries, and delusions of all kinds. Few of them seem to think it makes any difference what a man is so long as he observes the decencies—that is, some of the decencies—of his religion, whatever it is. They have a recipe for resolving into a substantial identity all the religions under the sun, the varieties being only according to climate, race, or mere accident. The philosophy and fables of Hindooism they think partly above, partly below, our level; and, on the other hand, they think Christianity utterly unsuited for the native of India, and evidently not intended for him. This is not timidity, but indifference, or a very comprehensive sort of latitudinarianism. Some people call it Pantheism, and tell us further that the Hindoos are Pantheists, and that we take it from them. However that may be Indian authorities are not so much afraid of exciting a religious warfare in India as careless, on principle, about the matter altogether, thinking it really no object to convert the natives, who answer our purpose better as Hindoos, or even as Mussulmans, than they would as members of our own faith and communion.

This, too, is the light in which we are naturally and correctly regarded in India. We are not suspected of any deep-laid plans of proselytism. At a recent meeting of the British Indian Association at Calcutta, composed of native gentlemen of the highest standing, they simply express their utter surprise at the remarks made by Lord Ellenborough in the House of Lords on certain alleged proselytizing acts of Lord Canning and the alleged fears of the Indians for their religion. The mutiny, they say, has no such

source, and the perfect toleration of the British Government is known and appreciated throughout all India. Our policy is manifestly that of Ackbar, and not that of Aurungzebe. The former of these, as was further stated at the meeting, encouraged the followers of all sects, religions, and modes of worship. "Jageers and Allumghas bearing his imperial seal are yet extant to show that he assigned lands and buildings for the endowment of Mahomedan Musjids, Christian Churches, and Hindoo Devaloys." Such has always been the practice of the Hindoos, and the Mahomedan Prince established his authority by adopting it, in place of the intolerance prescribed by his own creed. Hindoos, as it appears from some remarks made at the same meeting, have the highest respect for the Christian missionaries, classing them with the most eminent saints and most holy men of their own system; but it is quite evident that they regard our civil Government and the whole fabric of our power as utterly indifferent, as having no religion whatever, as being neither of any caste nor of that piety which in India makes caste and is an evidence of caste. Can it be doubted, however, that to zealots, like the Mahomedans and formalists, like the Hindoos, mere indifference must be more odious than bigotry, even were it also a little intolerant? Indeed to both of the great religions of the Indian Peninsular the line we take and the general inconsistency of our habits with our faith put us at once into the great class of outcasts. If this be indeed the light in which we are regarded, then is it time for the present guardians and pillars of the Indian Empire to clear themselves from the opprobrium of a rude and vulgar indifference. Simply as Christians we might be hated by the Mussulmans, and should not be despised; while by the Hindoos we should be neither hated nor despised. In their eyes we should be a caste as, indeed, we are, though formed, perpetuated, and sanctified on other principles and by other means than the castes of their own system. But on this point the testimony of the native gentlemen of Calcutta is conclusive. They respect all religionists in exact proportion to their zeal and consistency. What they do not respect is irreligion. What they hate, besides, is an irreligious insolence and contempt towards the religion of others.

From The Times, 10 Oct.

PUBLIC OPINION ON INDIA.

A PROCESS is now going on which, as it is a fact, must be looked in the face. What is called public opinion is taking in hand Indian affairs. Whether that be an advantage or not it matters little to inquire, for so is the fact, and it is a new and important phase in the politics of this country. Everybody now has something to say about it, and everybody with common sense, common feeling, and common information is listened to, even although his interest is only that of every Englishman, and his knowledge of India derived mainly from the papers. Major Beresford spoke only as an Englishman, yet with none of that diffidence prescribed upon every mere Englishman who presumes to open his mouth on this subject. Mr. Baxter, in a speech to his constituents reported in our yesterday's columns, takes more expressly, though unconsciously, the position of an Englishman just opening his eyes to the fact of our Indian Empire, having his feelings roused, his curiosity excited, and his responsibility awakened. So long as that mysterious and unapproachable body which actually governs India kept things quiet out there, the result was accepted as the best defence of what was otherwise often indefensible. But this argument is now gone; a century's spell is broken; a fearful catastrophe is enacted in the eyes of the whole world; every British eye is directed to that one region, every heart is strung, every tongue exclaims, every hand would fain rush to its familiar or unfamiliar weapon. Everybody is reflecting with as much calmness as he can master on what should be done, and, English fashion, is puzzling to make out how all this has come to pass. That appears to have been the chief direction of Mr. Baxter's speculations, and he has already provided a practical answer to the inquiry by going so far back and involving so many offenders, that nothing can come of it except in the way of warning. The truth is, everybody has been crying "Wolf" in India for half a century or more; and all that time usages have been going on that evidently tended to mutiny, but the mutiny never came, and the Indian Government thought that every year it postponed the costly and uncomfortable measures of prevention was so much gain to peace and finances. We need not look far

from home for similar examples. There are certain events which will undoubtedly take place one day or other in our own Church and State, but the perpetual litany of officials and dignitaries,—indeed, of quiet men of all kinds,—is "Give peace in our time, O Lord!" So the fault has been that of human, or, at least, English nature. Moreover, our national habit of changing our rulers has the unintended effect of wiping off many a troublesome score. Within these two years we have had a new Government at home; not only a new Government, but a new constitution for India—a new Governor-General, new Commanders-in-Chief,—indeed, everything new, except mutinous Sepoy regiments, incapable British commandants,—the only fixtures in the matter. Further, there certainly is a remarkable difficulty in getting to the bottom of Indian controversies. You meet a dozen Indians in succession, and they are all equally positive, but utterly at variance. One is a civilian, the other a soldier; one in the Bengal Army, another in the Bombay; one is a Queen's officer, another a Company's officer in the Line; another has had to do chiefly with Irregulars of one sort or another; lower down you have an indigo planter with his views of Indian affairs; then comes a clergyman or a missionary; then a high caste native gentleman from Calcutta, then a Parsee merchant. Every one of these smiles, and is positive; looks grave, but smothers in his bosom the fire of some rankling grievance, or some endless controversy. No; unless we intend to pursue our investigations till we come to the earth on the elephant, and the elephant on the tortoise, and the tortoise on a fish, we had better look forward, not backward, in this momentous question.

But the question henceforth is an English one. With the honor of our country so deeply compromised as it now is, with 85,000 of our countrymen there fighting our battle, with insults of every kind heaped upon us, our women outraged, our churches burnt, and thousands of native Christians massacred on our account, we all feel that the cause is our own. We cannot leave it in the hands of an invisible authority. The religious questions alone are of that interest that, once set on foot, they will agitate the whole British people. We may or may not be hypocrites and fanatics, but a nation which spends many hundred thousand a-year in the attempt to spread the Gospel all over the earth, and that annually sends out hundreds of devoted young men to the work, will, in fact, no longer endure that Christianity should be actually discouraged, and all but prohibited under some circumstances, throughout a vast country which we call our own, and which is under our laws. The difficulties of satisfying our own sense of truth and duty without a too violent interference with the native superstitions and delusions are not to be overlooked; but the British people are too much impressed with the truth and importance of their faith, and the responsibility devolving on its holders, not to allow it at least fair play. If it comes to them, as it must now do, they will not persecute their own faith, and so undo with their left hand what they are doing with their right. They may do things awkwardly; they may be often inconsistent; they may allow themselves to be baffled by influences more subtle than popular will; but they will not let matters rest on a plainly irreligious and scandalous footing; and whoever has the temerity to defend such a footing will find himself, soon or late, sent to the wall.

There is a universal conviction in the British people that the real enemies of their faith in India are not any impudent imposture or ridiculous mythology. We have to contend against various policies which use these things for weapons, against an immense amount of mere unbelief, and perhaps the still more serious obstacle of low Christian morals; but these are matters of which the British people is now fully cognizant, and it will not belie its convictions upon them. Nor, again, though it be a minor affair, will the British people be content that a country thrown on its protection and guidance should lag so far behind in all matters of material improvement, such as railways, cultivation, and manufactures. We may not do these things at home as well as we might do; we are certain to make mistakes when we try to do on the other side of the world what we very often bungle at our own doors; but that is not the question. What is the habit of the British people? Its habit is to grasp at more work than it can do, and to attempt the greater difficulty because it has failed in the less. It can see another's failure when it cannot correct its own. We may depend on it that India, once riven open to our eyes, and the subject of

audacious and indefatigable scrutiny, will not soon be laid aside. The events and disclosures of this year will give an impetus to feeling, to curiosity, and enterprise which none of us will live to see flagging.

We are far from saying that this result will be wholly unalloyed. We are fully aware that the empire of great dependencies, impossible to a republican government, is difficult to a mixed one like ours. We are aware that in the management of such a country as India there must be much policy of a sort which recoils from popular agitation and open discussion. Nor indeed, are we advocating a more public and responsible management of Indian affairs, as if it were a matter that rested on advocacy, and was before a tribunal. If any dependence is to be placed on the deep interest everywhere excited, on the strong opinions everywhere expressed, and the ready echo given to those opinions, the matter is past advocacy and tribunals. It is already resolved on, and when Parliament reassembles it will treat the subject with as little reserve and with as direct an appeal to the responsibility of the Minister as if it were a purely domestic question. That is the spirit in which the enterprising member for the Montrose Burghs invades the subject, and he certainly will not be alone. But even if he, or a dozen others, were silenced, or inoculated with old Indian reserve, nothing can undo the hold which India has now taken on the minds of the people, or disabuse that people of the belief that the question is their own. How far that interference will be pushed will depend on the success of our arms and the prosperity of India under the existing forms of administration, but no substantial obstacle will be allowed to interpose between India and England, that does and suffers so much for her. No Minister will be permitted to throw on the shadow of a Company or a Board the responsibility of measures or neglects in which we are all as deeply concerned as in the welfare of our own metropolis. No doubt, such a state of public feeling, if not otherwise satisfied, would lead eventually to the immediate assumption of India by the British Crown, and its administration by a Secretary of State, like any other Crown dependency. It would be vain to conceal that there are dangers in such a course; first and foremost, as has been recognized for a century, of that jobbery which may be called the curse of British politics. It is difficult to imagine any authority or any regulations strong enough to save Indian patronage from being quietly parcelled out among the supporters of Her Majesty's Government for the time being. But that is no affair of ours. We are not now advocating any constitutional change, and are not called on to answer any objection. We are only pointing out the fact that British opinion has now taken possession of Indian affairs, and will henceforth be content with nothing short of a direct voice upon them.

A Cyclopædia of Female Biography, consisting of Sketches of all Women who have been distinguished by great Talents, Strength of Character, Piety, Benevolence, or Moral Virtue of any kind, forming a complete Record of Womanly Excellence and Ability. Edited by Sarah Adams. (Groombridge & Sons.)

This title takes away our breath! The necessity of going out into the highways and hedges and "compelling" all women of great talent, strength of character, piety, benevolence, or moral virtue of any kind "*to come in*," has resulted in a somewhat motley gathering, and the company is what genteelly scrupulous people would call "mixed." Ladies, illustrious and obscure, are found side by side, who would not have spoken to each other in their natural lives. There is a great crowd, and nearly every body, from the Virgin Mary herself, who has nearly two pages dedicated to her, down to Lady Morgan, in modern times; of course, many are left out who would consider they had a right to a place, and others are there whom their neighbors would declare to have no right whatsoever. But the "Cyclopædia" is well intended, and if the details are meagre, at least there is evidently a desire to be honest and candid,—and the work is quite as well done as could reasonably be expected.—*Athenæum.*

A New Line of Business.—Lola Montez has had a new card printed. It is embossed all over with horsewhips, pistols, revolvers and bull-dogs. At the bottom, in the most elegant type, there is the following insinuating intimation.—Parties waited on, and duels arranged on the most reasonable terms. [Lola Montez is respectfully informed that the editor does not hold himself responsible for this paragraph.]—*Punch.*

A FIRM BANK.

[The following lines were written by the celebrated Rowland Hill, more than a quarter of a century ago, at a period of great commercial distress in England, when the moneyed institutions of that country seemed to be in a state of collapse, and universal bankruptcy threatened the nation.]—[*N. Y. Christian Intelligencer, (organ of the Dutch Reformed Church.) October* 29.

I HAVE a never-failing bank,
A more than golden store;
No earthly bank is half so rich;
How, then, can I be poor?
'Tis when my stock is spent and gone,
And I without a groat,
I'm glad to hasten to my bank
To beg a little note.
Sometimes my Banker smiling says,
"Why don't you oftener come?
And when you draw a *little* note,
Why not a *larger* sum?
Why live so niggardly and poor?
Your bank contains a plenty;
Why come and take a one-pound note,
When you may have a twenty?"
Yes, twenty thousand, ten times told,
Is but a trifling sum,
To what your Father hath laid up,
Secure in God his Son.
Since then, my Banker is so rich,
I have no cause to borrow;
I live upon my cash to-day,
And draw on him to-morrow.
I've been a thousand times before,
And never was rejected;
Sometimes my Banker gives me more
Than asked for or expected.
Sometimes I felt a little proud,
I managed things so clever!
But, ah! before the day was gone,
I felt as poor as ever.
I know my bank can never fail,
Its funds always the same;
The firm, "Three Persons in one God,"
Jehovah is his name.
Should all the banks of Britain break,
The Bank of England smash,
Bring in your note to Zion's bank,
You'll surely get your cash.
And if you have but one small note,
Fear not to bring it in;
Come boldly to the Throne of Grace,
The Banker is within.
All forged notes will be refused
Man's merits be rejected;
There's not a single note will pass
That God has not accepted.
There's none but those beloved of God,
Redeemed by precious blood,
That ever had a note to bring—
These are the gifts of God.
Though thousands, doubting, often say
They have no notes at all,
Because they feel the plague of sin,
So ruined by the fall.
This bank is full of precious notes,
All signed, and sealed, and free,
Though many a ransomed soul may say,
"There is not one for me."
Base unbelief will lead the most
To say what is not true;
I tell all souls that feel they're lost,
These notes belong to you.
The leper had a little note,
"Lord, if you will, you can;"
The Banker cashed this little note,
And healed the sickly man.
We read of one young man, indeed,
Whose riches did abound,
But in the Banker's book of grace
His name was never found.
But see the wretched dying thief
Hang by the Banker's side;
He cried, "Dear Lord, remember me;"
He got his cash, and died.

ZEROTES.

ZEROTES is a man of stone,
He lives but for himself alone;
No wife's endearments soothe his cares,
Nor sweet small footsteps on the stairs;
Nephew or niece he hates the name,
No place in hall or heart for them:
For no one in the world cares he,
And yet he fain beloved would be.

Grave views of life Zerotes takes.
He shuns all holidays and wakes;
A merry laugh provokes his frown,
He sternly puts all nonsense down.
When through the village runs the jest,
He stands unmoved amidst the rest.
A kill-joy hated much is he,
Yet fain Zerotes loved would be.

Of noble, thoughtful, generous, bold,
Zerotes lists not to be told;
Tell him of those who do amiss,
And suffer for't, you give him bliss.
Speak of the reckless and absurd,
He echoes each detractive word.
No gentle commentator he,
And yet he fain beloved would be.

Cold, timid, buttoned up, and grim,
Few e'er have been obliged to him;
Yet while he does so little good,
He talks of men's ingratitude—
Ungrateful, you may well believe,
For favors that they ne'er receive—
Yet though a misanthrope is he,
Zerotes fain beloved would be.

Self-love, O, what a witch thou art,
What tricks thou playest with the heart!
To keep this wisest of mankind
To one small piece of wisdom blind;
In cheerless life, day after day,
To make him waste himself away,
Seeing not what a child can see;
The unloving ne'er beloved can be!

[From an elegant volume, entitled *Poetic Trifles*, by Thomas E. Hickey. Amidst the host of the followers of Tennyson and Longfellow, we hail with much pleasure one who appears more inclined to cultivate the common-sense mood, now too much neglected.—ED.]

—*Chambers' Journal.*

From Fraser's Magazine.

THE CURATE OF EDENHOLM.

It is a trite remark that the ranks of the English aristocracy, with all their exclusiveness, are yet open to every Englishman. Trite though it be, it must always be striking; like other trite sayings indeed, it is trite because it is striking; a fact so remarkable, that everybody thinks it worth noticing; and thence it becomes trite. That cold, haughty aristocracy, so far removed from the common life of common people, which Englishmen are nevertheless so proud of,—why are they proud of it? Because of its noble lineage and long pedigrees? These are something, but not enough to satisfy a people who have cashiered in turn Plantagenet and Stuart. Because of its very haughtiness? because men are full of paradox, and love the pride which they profess to abhor? Something in this, too; yet were a proud aristocracy *ipso facto* stable, many lordly houses long since swept away would still be flourishing among us. Why is it, then, that the proud, exclusive, cold, distant English aristocracy is not only tolerated but loved? for tolerated it would not be if it were not loved. Because, with all its pride and all its exclusiveness to those beyond its pale, that pale is, notwithstanding, open to all. Any laborer's son who has a turn for study may go to school and college, become a clergyman or a lawyer, and die Archbishop of Canterbury or Chancellor of England. And not only is this possible, but it has actually happened,—has happened often enough to make everybody feel that it is not impossible in the case of himself, or some one of those nearest to him. The gulf between a farmer's boy and a mitre does indeed seem immeasurable; but the gulf between a farmer's boy and priests' orders is one which it needs no peculiarly sanguine imagination to overleap, and once a priest, it is no longer ridiculous, or monstrous, or very highly improbable for the farmer's boy to dream of dying at Lambeth, the first subject in the realm. The Church is the medium in which the different classes of English society most nearly approach each other. The premier peer of the land cannot, by the rules of society, refuse to acknowledge the poorest clergyman as a gentleman, belonging, in fact, to the same great order as himself; many of the lowest of the people—using the term lowest to signify worldly circumstances—have become, and are daily becoming, clergymen. Alternations of rank, worldly exaltation—these have been for centuries the ground of all romance; no wonder, then, that in the region common to the two great sections of English society, in the ranks of the poor parsons should be found the hero of many a true romance, as thrilling, though perhaps less turbulent, than any furnished in former days by the caprice of war or the ups and downs of chivalry.

More than one generation has passed away since Ellen Warner was married to Mr. Rawden, the priest of Edenholm. It was not considered a great match for Ellen, though she was but a shepherd's daughter, and her husband a clergyman of the Church of England. For among the hills and valleys of Cumberland those shepherds have or had (for times change even in the mountains, and the shepherds are a decaying race) an aristocratic rank of their own, such as the reader of Wordsworth will be able to understand. On the other hand, the parson in those out-of-the-way places was no very great man. A "scholar and a gentleman" would rather wait many years for a living than settle down to a life-long banishment from the great world such as was entailed by undertaking the spiritual charge of a small, comparatively wealthy congregation dwelling in a few scattered farm-looking houses on a hill side in Cumberland; and consequently these benefices were filled up by men who, for the most part, could certainly not be called either the one or the other. A writer in the *Edinburgh Review* some time ago drew a harsh but probably a true picture of "the Church of England among the mountains." Poor men without a college education, too often without any sufficient education of any kind, are ordained as "literate persons," to fulfil duties which their more polished and better qualified brethren do not choose to undertake. Buried in the seclusion of a remote mountain district, a few years suffice to rub off whatever little knowledge of the outer world they once possessed, and with this knowledge vanishes all claim to superiority over their flock. They become pastors in a literal rather than a metaphorical sense. They read the Church service and a homily on Sunday; on week-days they range the hills, look after sheep—absolute matter-of-fact muttons—attend fairs, even as other men. They perform baptisms,

marriages, and burials, as part of their vocation, just as the bone-setter sets bones and the farrier shoes horses and doctors cattle; but for the rest they differ not from their neighbors; in the field, at the board, sometimes even in the public house, the parson is hail fellow well met, with the poorest of his parishioners.

Therefore nobody was surprised when the daughter of Richard Warner, one of the most well to do statesmen in the township, married the Rev. E. Rawden, nor thought the girl particularly fortunate—indeed, the parson was esteemed the lucky one of the two by his neighbors, in having won so frugal, so virtuous, and withal so fair, a wife; and in this matter, to tell the truth, the neighbors judged wisely. Ellen Warner was not perhaps a conventional "child of nature," but she was something better—a true north-country Englishwoman. If we cannot with honesty paint her as an enthusiastic timid daughter of the Mist, loving and almost communing with the mountains among which she dwelt, interesting in the simplicity of innocent barbarism, yet she was indeed a creature more intelligible, as much to be admired, and hardly less rare. The intercourse with rocks and streams had not imparted romance to her language, or any strange unworldliness to her habits and thoughts; she like her neighbors, thought little of the beautiful country in which she lived, scarcely knew the names of the hills, never ascended them, except on business, to carry a message to her father, or to assist him while engaged in his daily duty on the fells; admiration of scenery is the result generally of leisure and cultivation. The simple and unsophisticated peasant has less of the feeling than is commonly attributed to him. But it were indeed false to say that intercourse with rocks and streams had no influence on Ellen's mind. They never afforded her a tourist's raptures, nor the higher pleasures of an artist; yet it was not in vain that the solemn mountains had looked down upon her from her childhood, and that the pure streams had daily run their joyous course before her eyes. She participated in the strength and native truth of the one, the purity of the other. Simple, vigorous, sprightly, active in body and mind, above all sensible and true, such an one was Ellen, —the best daughter, the most careful and thriving housewife—for her mother had long been dead, and she kept her father's home—and withal the prettiest girl, in Edenholm.

Edward Rawden was no stranger to the place when he came to it as pastor. He was the inheritor of some acres and a flock of sheep; he had been brought up in the valley —an equal among equals; had evinced a transient inclination for studious pursuits as a boy, on the strength of which he had been slightly educated, and then struggled into orders, nobody exactly knew how. All literary interest had long since subsided in him when he was ordained; and at the time he married Ellen he was as complete a shepherd as her father was, looked after his farm and his flock in shepherd's dress during the week, and only put on a suit of rusty black to hurry through a formal service to a thin congregation on Sunday.

The marriage between him and Ellen was, it must be allowed, a marriage of convenience on both sides; for such marriages there are, if the truth is known, in remote valleys, no less than in dissipated capitals. Ellen was her father's heiress; she and Edward Rawden had known each other all their lives, liked each other, were equals in worldly wealth and (at least, in the only world they knew or were likely to know of) in worldly rank, and so they married: a sober, sensible, matter-of-fact, terrible unromantic sort of business.

But who shall venture to call any fact, any event in a human life, dull or unromantic? That marriage and its consequences—how did it influence the fate of those concerned in it, of those as yet unborn! Edward Rawden, always a poor creature, did not improve as he grew older. He was not much to be blamed, considering his position, for choosing to be a farmer rather than a clergyman; but he began gradually to fall into the worst ways of his farming neighbors—to lounge, and to gossip, and to drink, till he got to be known, not as a clergyman, nor yet as a farmer and shepherd, but as a boon companion. And according to the mysterious order of human destinies, the more he declined, the more did Ellen rise. Her pure nature revolted from sensuality: she had, with rare good fortune, seldom witnessed it in the house of her father—a frugal, temperate, much-respected man. It shocked her so, that she took refuge in the purest and highest recesses of her own nature; and so faculties before la-

tent were drawn out. She might have lived and died a sensible, good-natured, simple-hearted girl, and this would have been well. But Ellen was destined for a bitter and more painful lot. Whatever was best and most refined in her was roused, not merely by the sight of her husband's vice, but by the daily battle which she was forced to fight against it, against herself for his sake, and, worst of all, sometimes against him for her children's sake; for ten years after her marriage found Ellen the mother of two sons—Richard and Francis, eight and six years old. Francis, the younger, was her heart's treasure—the one idol which that poor woman, in the fortitude of her daily conflict, allowed herself as a solace to her weakness. He was a beautiful boy, with his mother's comely features, with that rosy strength which is the heritage of mountain children; and in him the intellectual spark which rested for a short time upon his father's youth, seemed to have kindled a more enduring light. And so Ellen lived, her self-control, her patience, and her wisdom daily tried in striving to keep at one the discordant elements of a husband's neglect, a father's evil example, and children's innocence; her intellectual faculties long dormant, spurred into activity by the emulous quickness of her darling child; a secret dread lest the time should come when he had outgrown her best instructions. Of course the time did come: sadly and reluctantly she recognized it, but once recognized, she never rested till she had made the sacrifice required of her. The child must be educated; he had talents which must not be buried among mountain sheep-tracts: but his education involved separation from herself. Honor be given to England, that the poorest can, in almost all cases, find an opening for ability and diligence. Ellen had little difficulty in finding friends, who, perceiving that the superiority of Francis to most boys of his age or station was more than a mere maternal conceit, undertook to provide for his education; so at ten years old he was sent to London, to a good school, where, as the son of a poor clergyman—and poor indeed his father was by his own fault fast becoming—he received a good education, at a moderate cost. Poor Ellen! Here, then, seemed to be the end of her care and strife; this the mocking answer to her petitions to her friends to do that for her boy which, being done, had made her life a blank.

And at first, when she had still to bear the unkindness of her husband, sullenly complaining that efforts were made for the child which were never attempted for him: when she had still to endure his fierce, intoxicated violence, still to labor at the dreary task of keeping from his example and his influence the son that was yet left to her; and when, sick at heart with this unprofitable and seemingly unending toil, she went to the room where Francis had slept, and, reclining on his little bed, looking at the few treasured books by the help of which she had so labored to teach him more than she herself knew, thought that Francis himself was among strangers, learning to know and to love them; that he was among those of a different position in life to his home neighbors, beginning to feel himself one of them, and thus to be separated from her, not only by distance, but by a yet wider gap, by class; thought of him whose childhood was absolutely gone from her forever, who, if ever he came back, would come, not as the fair-haired, blue-eyed boy she loved, but grown and passed on into another stage of existence,—then her burden seemed more heavy than she could bear, and she thought she could no longer live beneath it. But she did live, and with life came other thoughts and better hopes. Her first ambition revived, now strengthened by more probable circumstances. Francis should be a gentleman; and it were but poor philosophy to sneer at the vanity or the meanness of an aspiration which was, at any rate, able to console an otherwise broken-hearted mother.

Meanwhile Francis seemed likely to fulfil all her hopes. He worked well; ripening years did justice to her early discernment of his great ability; he was not only tolerated as an equal, but caressed as a favorite by his gentlemen schoolfellows, and better than all, together with all this, he wrote frequent letters to his mother, the memory of whom he seemed still to cherish as his guardian angel, and still, though getting an old boy, to cling to with a child's worship. Ellen was supported now by her hope even more than she had been by the sight and presence of her darling. Her home task became not lighter but heavier; for Richard as he grew up seemed more likely to follow in the ways of his father than of his mother or of Francis, but nevertheless her brow was less clouded

than it had been; and with all her old gentleness and firmness there was also more than her old cheerfulness; and perhaps she might have been called happy could she but have rested content with the portion of happiness which she had. But which of mortals has yet attained to this degree of wisdom? Fate has smiled scornfully from the beginning and will do so to the end, at the infatuation of men who thinking to mend their lot hasten to their ruin. It was five years after Francis went to school that the friends who had sent him there yielded to Ellen's importunity, and had him down to Cumberland for his Christmas holidays. For months beforehand the day of his arrival was calculated, looked forward to, dwelt upon, and expected with sickening eagerness. It came, and with it the end of poor Ellen's short dream of happiness: the spell was broken;—Francis recoiled with disgust from society and ways of life which the refinement of his school habits and companionship had made unbearable to him. His mother was his sole companion—he still loved her, and her refined nature was the only compensation he could find in Edenholm for the refined manners which he missed. But even towards her his feelings were all changed: the mother to whom his child's worship had clung was gone; here was one whom he respected, whom he felt grateful to, whom he pitied—hard lot in itself when the son has to pity the mother whom he earnestly endeavored to love:—but even in his intercourse with her, difference of manner, of association, of all standard of comparison, created a breach between them, the more painful and irritating because the mother knew it not, and the son knowing too well, was bitterly ashamed of it. To Francis it was a greater relief than he dared own to himself when the holidays were ended and he returned to London. Ellen saw him depart with unutterable misgivings; and with a heart yet more sad, with a brow clouded over in gloom never again to be altogether lightened, she turned to her home duties, as she had done when Francis first left her, a little, fair-haired child, crying bitterly for her loss, returning to her love for love five years before.

Four years longer Francis continued at school: pondering much, now that he understood it, over his position in life. He, too, felt it now absolutely necessary to his happiness to be a gentleman. The same ambition which had moved all the loving, self-sacrificing springs of his mother's heart sat with a sterner aspect upon him. The lesson of class distinction is soon learnt. Francis felt that he must either be different from all his schoolfellows—different from all he himself cared for—or different from his family. It is not to be supposed that the thought of his mother cost him no pang, or that he deliberately rejected her as inconsistent with his dreams of advancement: he was not more cold or selfish than others, but vanity and the spirit of the world, joined to something of a nobler ambition, ruled him as they rule others: he worked hard, for he felt that on his exertions depended his position, and tacitly his family. Even his mother fell away more and more from the scope of his interest and considerations; his letters to her became fewer, shorter, and more formal.

His good looks and agreeable manner increased his temptation. Had he been gross or awkward, talent alone might not have sufficed to obliterate, in the estimation of his schoolfellows, the recollection of the poor, coarsely-clothed, broad-speaking Cumberland lad who had been sent to town by rich patrons, and kept there on charity. But he was a favorite in all society—of a good presence, a gentlemanly manner, and, after all, a clergyman's son. This last fact he began more and more to appreciate the advantage of. In circles where nothing of his history was known, he became gradually not ashamed to make use of the accidental advantage of his father's holding an office which he disgraced, while he shrank from all mention, and was almost ashamed of the thought, of his noble-hearted mother, who had died to all joy for his sake. Sad confession! yet those who know the world and their own hearts best will think most leniently of Francis.

At the age of nineteen he obtained an exhibition, which enabled him, with some slight assistance, to proceed to the University; and one year afterwards he obtained a scholarship at —— College, Cambridge, which for the term of his undergraduate career put him, by the help of a severe economy, such as he had little difficulty in practising, above the need of any assistance at all. About the same time he heard from his mother—whose weekly, loving, and, as Francis grew mani-

festly more indifferent, almost beseeching, letters never failed to reach him, sometimes to soften, sometimes to irritate, but most often only to occasion an unpleasant but very transient embarrassment — of his father's death. He could hardly conceal from himself that he felt this as a relief. He had never been attached to his father—that indeed was impossible; and now, just when he was become for the first time independent—a gentleman in his own right—this event occurred, enabling him for the future to take his position as the son of a clergyman, free from the danger of unpleasant inquiries as to what kind of a clergyman; and generally loosening the ties which held him to his family. To Ellen herself, the death of her husband brought not so much relief as a change of sorrows. Her eldest son had turned out ill, left home, enlisted, and since died in a foreign country; and now she was left alone to brood over the grief of an unrequited love—to mourn for her son estranged from her; that son whom she had so loved, and who had so loved her; by the thought of whom alone her gloomy life had been for a while cheered. She felt his alienation the more bitterly now that her mind was not diverted by the arduous struggles which, while her husband lived, were renewing themselves daily; she remembered her old desire that Francis should rise above his station, and it was strange how she still clung to this desire, and still derived a certain pleasure in the apparent approaching fulfilment of it, even while perceiving and feeling so keenly what it had cost her.

Meanwhile, the career of Francis Rawden at the University was more than creditable—it was brilliant. Living rigidly upon his small, self-earned income; pursuing his ambition, the objects of which dilated more and more before him as he still pressed forward, and seemed to find all within his reach; a man of mark beyond the walls of his own college, he took high University honors, and was confident of obtaining a Fellowship which would confirm his independence for life. The Fellowship was open to competition; but so great had been Francis Rawden's University successes, his superiority to his present rivals so decided, that everybody looked upon the event as certain before the examination had commenced. He himself only doubted his own success, because it was to him too great an object to be lightly regarded as certain. If he obtained the Fellowship he was started in life, and might trust to himself to hold his way thereafter; but if he failed, all his previous successes were nothing. His old patrons were unable any longer to help him; his scholarship was on the point of expiring; his small inheritance, reduced by his father's misconduct, might support him as a farmer at Edenholm, but certainly not as a graduate at the University. All depended upon this one cast.

It wanted still six weeks to the day of examination when he received a letter from his mother, saying that she was ill, and rather hinting her wish than absolutely requesting that he would come down and see her. He, thinking lightly of the illness, and irritated at the request, wrote back, in a strain more cold than usual, that his affairs made it absolutely impossible for him to leave his college life at that time. He received a sad, meek acknowledgment of this refusal; Ellen had been used to disappointment, and hardly expected anything else. But she grew worse; and believing herself to be dying, could no longer refrain, and wrote one more earnest appeal to her beloved son. All the old days returned to her as she wrote. The little Francis whom she taught to read, and whose quickness she so soon detected; the child clinging to her with a love greater than her own; the days when her life had been bound up in his smiles and tears, his childish joys and sorrows; his departure, and her then importunity that she might see him again;—all this pressed upon her, and in the fulness of her heart she conjured him by the long love she had borne him to come to her. Still there was no word of reproach for his palpable long-continued indifference; and towards the end of her letter, when turning her thoughts from the past she transferred them to the present, to the circumstances and the prospects of her son—a different being, it seemed, from that son of former days, whose image yet remained distinctly painted on her memory,—she begged that after all he would not come, if by so doing he would mar his fortunes. Francis received this letter a fortnight before the critical day. His soul was wrung within him. He was not so hard but that his mother's appeal and the memories she invoked moved him; and at one time he had resolved to postpone his triumph, and at

all events to go. But even as he so resolved, some trivial speech made by a careless bystander recalled him to a full sense of the sweets of that triumph, and in that moment the tempter rushed in and overcame him. Excuses followed; he dwelt on the latter part of his mother's letter: he was but obeying her wishes; after all, his success was her success. She could not understand his position, or she would never have asked him to come; he would go home directly after the election. And so he wrote a kind letter to his mother—more like one of his old boy-letters than he had written for many a long day, saying he could not come yet. Of all the bitter tears wrung from poor Ellen in her painful life, the tear which fell when she first found that she was to see her son no more, was the bitterest. Then consolation followed in the tone of his letter: for days she kept it by her, and read it over again and again; and with a scarcely conscious purpose of distinction, placed it at last in the cherished heap of his early school letters, and not with those of more recent years. Those early school letters and this latest one of all were her daily study; they were to her all that was tangible of her former idol. The last few days of her life were perhaps happier than any she had known since the time when Francis first returned to her from school: still thankfully enjoying and lingering over this faint gleam of happiness that shone with its feeble light across her dark life of sorrow, Ellen Rawden died.

The examination-day arrived. If Francis was excited, nobody else was—his success was regarded as so certain. He himself felt his hopes rise directly the work had begun; he felt more and more confident till, in the middle of the day, a letter was put into his hand, the writing of which he did not recognise. He opened it mechanically, and found a brief, business-like announcement of his mother's death. Then remorse rushed upon him—remorse that had never entirely let him alone, but which had been put off by resolutions of future alteration of conduct. "First gain my object"—so he had calculated—"and then I will make amends for all former unkindness." But now he could never make amends: death stood betweem him and any possible change of conduct. He tried to put the thought altogether away from him; but the burden of shame, gradually mingling with the more tolerable burden of sorrow and regret and affectionate remembrance, weighed him down more and more; he was seized with a sudden loathing for the objects which he had been so long pursuing; he concluded the paper on which he was engaged abruptly, and virtually abandoned the contest, which was ultimately decided, to the surprise of every one except himself, against him. He was neither surprised nor moved. One thought alone possessed him—his mother was dead. He knew that in that fact, which lay on him with a bewildering weight, was involved a mine of bitter reflections, which as yet he dared not face. He travelled down forthwith to Cumberland, and reached Edenholm on the morning of the day fixed for his mother's funeral; she was buried that afternoon. It was late winter; the mountains covered with snow; the trees leafless; no sign of leaf or flower; but yet there was that silent, conscious presence of vitality which foreruns the actual spring. And as Francis saw the coffin lowered into the grave by the side of his father's, then, for the first time, he understood it all. That grief which he had known was to come, but which as yet he had not comprehended, now burst upon him. Turning homeward to the deserted house, he saw it yet more plainly. His letters, so treasured—with that division, so full of silent reproach, between the earlier and the later ones; the picture of himself, taken when a child; his old lesson-books,—all these told a plain tale not to be mistaken. He saw his mother's life of sorrow, with its one hope, and that hope blighted by his selfishness. He thought of her in that small room, thinking of him, writing to him, longing for him; and of himself, in his far-off, busy, amused life, ashamed of, shrinking from, repelling her love. Going into the village, he saw more. He saw the empty church, the full public-house, the neglected school, the ignorant, dissolute inhabitants testifying against the neglect and the vice of that father of whom, for the sake of his position, he had been proud. And then he understood that the whole plan of his life had been mean, paltry, and selfish; then, for the first time, the treasures of his acquired knowledge seemed worthless, as he perceived that they had been heaped up, not for his fellow-men, but for himself; then, in a word, he saw, in the full contrast of his mother's life and his own, the infinite difference between

selfishness and love. Many days he mused on these things in the lonely house and by his mother's grave; and if grief and penitence can change a man, then Francis Rawden was truly changed.

He returned to the University, but his mind was made up, and his sojourn there was brief. For a year he took pupils, obtaining them without difficulty, for his fame as a scholar survived his retirement from society; and at the end of that time, with some slight sum saved from his earnings as a tutor, to be added to his paternal inheritance, he went down again to Edenholm.

We hear much of missions to distant lands, and we pay just honor to those who labor in them; but there are missions nearer home that are less thought of—missionaries amongst us whose lot is none the easier because it is obscure. Francis Rawden took orders, and obtained after some years the cure which his father had held before him. To that work he devoted himself, living as his father had done in one sense—an equal among equals in respect of wealth and station; but, unlike his father, devoting all his energies, talent, and learning to the care of the people among whom he lived. He never went or looked beyond that valley; his ambition lay mortified in his mother's grave: but surely her purer ambition for her son was more than realized. He did indeed, in good works and labors of love, rise above, not his class alone, but the great number of the children of men: nor were his labors unfruitful. When, at the early age of forty, Francis was laid beside his parents, it was amid the deep, heartfelt lamentations of that sturdy mountain race among whom he had built up, not merely the Church of England, but indeed the Church of God.

W. D. A.

"IN REMEMBRANCE OF DOUGLASS JERROLD."—At the death of Mr. Jerrold in June last, it was understood that his surviving family were left in a condition far short of penury, but which yet scarcely reached that pitch of comfort in which the friends and admirers of the deceased were anxious to see them placed. In these circumstances, Mr. Charles Dickens came forward, and with the assistance of a number of literary and other friends, gave a series of amateur theatrical performances, readings and lectures, as he delicately said, "in *remembrance* of Douglass Jerrold." These were so heartily patronized by the public, that before the end of August two thousand pounds had been realized and expended in the purchase of a government annuity for Mrs. Jerrold and her unmarried daughter.

Taking this pleasant little affair in connection with the similar exertions made by Mr. Thackeray and others not long since in behalf of the widow of Angus B. Reach, we feel prompted to remark the increased power and influence of literary men in our day, and the greatly improved mutual feeling now existing amongst them. Forty years ago, there was neither this power for good, nor the inclination so to use it. In an earlier age, the descendants even of a Milton had to be sought for after a few years in the haunts of humble life. Now, a Dickens or a Thackeray comes in like an angelic messenger, and with the loving heart of one, to re-illumine the desolated hearth of their less fortunate literary *confreres*. Nothing, we believe, could be further from the hearts of these men than the desire to see their acts of this kind noted; but it has appeared to us that the Jerrold Remembrance in particular was too remarkable a feature of literary life in our day to be passed over in silence. We, after all, use not a word of mere praise; we desire to raise no roll of applause. We only congratulate Mr. Dickens, that, in addition to all the results of his well-earned literary fame, he can reckon on the power of effecting so much good to his fellow creatures.—*Chambers' Journal.*

PRESERVING FISH.—Fish may be preserved in a dry state, and perfectly fresh, by means of sugar alone. Fresh fish may be thus kept for some days, so as to be as good when boiled as if just caught. If dried and kept free from mouldiness, there seems no limit to their preservation; and they are much more nutritious in this way than when salted. This process is particularly valuable in making what is called kippered salmon; and the fish preserved in this manner are far superior in quality and flavor to those which are salted or smoked. A few tablespoonfuls of brown sugar are sufficient for a salmon of five or six pounds' weight; and if salt be desired, a tea-spoonful or two may be added. Saltpetre may be used instead of salt, if it be wished to make the kipper hard.—*Cooley's Cyclopædia.*

AUSTRALIA, with leisure and wealth enough to encourage Art, is about to bestow its first commission on a young sculptor. A full-length figure of Mr. Wentworth, one of the oldest and most influential colonists, is to be erected at Sydney, and the commission, we understand, has been given to Mr. Thomas Woolner, the sculptor of the fine bust of Tennyson.

From The Saturday Review.

LA DANIELLA.*

THE novels of George Sand are seldom entertaining; and the last she has written, *La Daniella*, is perhaps less entertaining than any of its predecessors. Whatever may be the merits of the writer, it is hard work reading through two thick volumes of a fiction where there is scarcely any plot—where the characters are sketched faintly, and hinted at rather than fully delineated—and where there is little to startle, amuse, or touch us. *La Daniella* has the great fault which marks all the recent productions of George Sand—it is very much too long. It is spun out with an audacious prolixity, as if the writer were amusing herself with seeing how much she could make the public read. Perhaps this prolixity may arise from a wish to meet the demands of the publisher for a two-volumed story; or possibly, it springs from what is a very prominent characteristic of the writer's mind. George Sand is essentially reflective and self-contemplative—she writes because she feels, and as she feels. It is the world within, and not the world without, with which she occupies herself. Being, however, of an impulsive and passionate nature, certain subjects, such as the problems of social life and the range of artistic excitement, have taken a deep hold on her imagination. While these subjects were new to her, she worked them with a spontaneous life and freshness which enabled her in a great measure to dispense with action and incident in her fictions. Now that she has grown calmer, sadder—in one word, older—she gives us reflections as original and as suggestive as ever, but which, from the very fact that they are truer to life and nature, more soberly expressed, and more patiently elaborated, have less to stimulate and fascinate the reader. It is not that her powers have decayed, but their maturity itself makes her productions less effective. Secure of an attentive audience, she goes on page after page writing whatever comes uppermost, without regard either for those whom she addresses, or for the puppets of her romance. But, although *La Daniella*, in which she has indulged her genius to the uttermost, is tedious, spiritless, and flat, it bears abundant traces of a master-hand. It contains many passages which no one but George Sand could have written—passages full of subtlety, of a nobleness of aspiration, and of nice observation, and expressed with that wonderful grace, ease and *abandon*, the command of which is the greatest of her gifts.

A reflective story-teller is never without a specific purpose. In inferior hands this purpose degenerates into a moral or religious lesson, which the story is supposed to teach. But, with a great writer, it is nothing but the outpouring of the particular thoughts which happen to fill the author's mind at the time of composition. There is no distinction between the two, except in the degree of individuality and originality with which the writer approaches the subject. The theme of *La Daniella* is "all for love." The book is an echo of the cry which we hear arising from the lips of so many of the leaders of thought in France, who are appalled at the growing taste for material happiness—at the ignorance, baseness, and poverty of soul which follow in the train of national avarice. M. de Montalembert has recently made a spirited appeal to his countrymen against this, the greatest of moral curses that can beset a people, with the one exception of religious fanaticism—of the evil of which it falls short, because the weakly good recoil from avarice, but are attracted by bigotry. "Even in romances," says George Sand, "which would seem to be the proper home for an ideal more pure than that of the share list and the Bourse, I often see the expression of an impetuous desire for a treasure like that of the grottos of *Monte Cristo*, and am neither astonished nor scandalized at it. I see that in a society so uncertain and troubled as ours, while Europe trembles with fear and hope, between dreams of a fabulous prosperity and of a universal social cataclysm, men of vivid imagination rush into that terrible determination 'to be rich or to die.' It is one of the evils of our day, and we bring on ourselves an infinity of misery because we wish to build a big ship when we really need nothing more than a little boat." It is the object of *La Daniella* to show that the man who builds the big ship sails through life distracted, anxious, and in danger, while the owner of the little boat has a tranquil, safe, and happy voyage.

In England, we never disconnect individual improvement from the scheme of constituted society. The virtue that is to be encouraged

* *La Daniella.* Par George Sand. Paris: 1857.

must be a virtue that will fit into the established order of public and religious life. The means to be adopted must be means which would practically answer in the case of men and women holding a certain position in English towns and counties. In France it is not so. The individual is not asked to take his proper place in the fabric of the State, to fall into the groove of patriarchal respectability, or to harmonize his thoughts with the influences of a recognized religion. The appeal is only to himself. He is asked to look into his own heart—to find out when and why he is best—to give free play to his generous emotions—to accept honestly the unalterable facts of human life. In *La Daniella*, a poor French artist, trained simply, and of a noble, quiet, thoughtful disposition, goes to Italy, and there is invited to visit the family of an English nobleman, to whom he renders assistance against a sudden attack of bandits. In the house of this nobleman, Valreg, the artist, meets a niece of the nobleman's wife, Miss Medora, and also Miss Medora's Italian lady's-maid, La Daniella. With the eccentric insolence of British wealth, Miss Medora makes violent love to the artist, who receives her advances with the utmost coolness. He greatly prefers Daniella, who is consequently sent away by her jealous mistress. She meets Valreg again, when chance takes him near the village where her family resides. The end of it is, that she returns his passion, and, as she modestly expresses it, *se passant de prêtre*, flies to his arms. He is touched by the generosity of her sacrifice and the nobleness of her character, falls seriously in love with her, and marries her. He refuses the offer of a competency made him by his rich friends, and leads the life of a poor artist engaged in the decoration of a palace situated in the village where Daniella lives. Different circumstances arise to call out and strengthen the better qualities of the lovers. Valreg, as a husband and father, finds in his family the sphere which best admits of his becoming all that he aspires to be; and Daniella, heartily repenting a fit of furious jealousy to which she on one occasion gives way, learns to moderate the violence natural to an uneducated Italian. A companion of Valreg, an ambitious, needy, daring adventurer, tries to win the hand and wealth of Miss Medora; and it is in the contrast which this couple, with their folly, pettiness, and selfishness, present to the peaceful dignity of Valreg and his wife, that the moral of the story is to be found.

To English readers the moral is absurd. To tell a young Englishman, whom we wanted to improve, that the best thing he could do would be to make first a mistress, and then a wife, of an Italian lady's-maid, would be simply ridiculous. The whole thing is quite out of the range of English family life. We immediately begin to think how the young couple would be tabooed. No cousin would write to them. No maiden aunt would leave them a legacy. But if we get rid altogether of these very sensible considerations, leave England and English society entirely out of sight, and think merely of the course to be taken by an individual whose moral growth was not supported by external props, we find there is some meaning in *La Daniella*. Valreg and Daniella are thrown together—they are fond of each other and their passion leads them on. Up to this point there is no lesson whatever. Very natural circumstances lead to very natural results. But immediately after this point is attained, the crucial test of Valreg's conduct begins. He is struck by the greatness of what Daniella has done for him—he finds in her the seeds of a noble character. Shall he give way to this emotion? Perhaps no question could be raised better fitted to try the worth of worldly notions, and to elicit the difference of opinion between the author and her adversaries. The more we consider it, the more shall we find that behaving well to a woman who is in our power goes down to the root of all that excellence which man, when looked on as isolated from society, can display.

The scene of the story is laid in the vicinity of Rome. There are many authors who can describe scenery more distinctly and effectively than George Sand; but there is no one who can surpass her in the power of giving an impression of the deep feeling with which the scenery described has possessed itself of the mind of the writer, or who more thoroughly carries the charm of personality, and of a subjective richness of meaning, into representations of the external world. She has a singular facility in marking out some features of what she wishes to paint, which stamp the scenery portrayed forever in our recollection. The general description of the

Campagna affords an excellent example of this :—

"There is a sort of failure in the effect produced by the plain of Rome. This arises from a want of proportion—the plain is too great for the mountains. It is a vast picture with a tiny frame. There is too much sky, and nothing is so formed as to arrest the attention. All is solemn, but tiring, like a sea in the level of a calm. The very civilization of the country is so managed as to spoil it; for it just suffices to prevent the sensation of loneliness and the awe of real solitude."

This appears to us in the best style of subjective landscape-painting. And George Sand has two faculties which connect her with the more external view of nature, and give body to all she writes on the appearance of natural beauties. She has the eye of a colorist, and she has the most lively interest in the various forms of animal life around her. Thus, in *La Daniella*, when she has to describe an old ruin where Valreg passes much of his time, she makes her sketch distinct and real, by noticing the animals which Valreg saw around him. She speaks of the little serpents, and of the way they crawled, of the kid and the rabbits which he fed, of the abundance of scorpions, and of the curious rarity of butterflies. "I know by sight," says Valreg, "every thing that grows and flies in the places where I have lived some time." The author is speaking here herself, and it is her own tastes that she records. Nor is this less so in a passage where she describes the instinctive manner in which an artist gathers into his range of sight, and treasures up in the storehouse of his memory, every striking effect of form, of light and shade, of depth and harmony of color, whatever may be the thoughts that otherwise occupy his mind, and however great may be the pressure which adverse external circumstances are exerting on him at the time. But although there are many fruits of this artistic sensibility scattered through the work, it is not these fruits that constitute the chief excellence of *La Daniella*. It is in the analysis of the less obvious relations of the sexes—of the treacherous delights of female friendship, and the rough differences of married lovers—that George Sand shows the full scope of her genius. *La Daniella* has much of this analysis wherewith to reward the patient reader. As a novel, it can never be popular; but it is not without importance as a sample of French literature, and it cannot fail to interest all who wish to watch the course through which so remarkable a mind as that of its author is carried in the progress of its development.

GLASS-ENGRAVING.—ON being told that I had come to see glass-engraving, the young man plied his wheel briskly, and taking up a ruby tazza, in a few minutes there stood a deer with branching antlers on a rough hillock in its centre —a pure white intaglio set in the red. I had never before seen the process, and was surprised by its simplicity. All those landscapes, hunting-scenes, pastoral groups, and whatever else which appear as exquisite carvings in the glass, are produced by a few tiny copper wheels or disks. The engraver sits at a small lathe against a window, with a little rack before him, containing about a score of the copper disks, varying in size from the diameter of a half-penny down to its thickness, all mounted on spindles, and sharpened on the edge. He paints a rough outline of the design on the surface of the glass, and selecting the disk that suits best, he touches the edge with a drop of oil, inserts it in the mandril, sets it spinning, and holding the glass against it from below, the little wheel eats its way in with astonishing rapidity. The glass, held lightly in the hands, is shifted about continually, till all the greater parts of the figure are worked out; then, for the lesser parts, a smaller disk is used; and at last the finest touches, such as blades of grass, the tips of antlers, eyebrows, and so forth, are put in with the smallest. Every minute he holds the glass up between his eye and the light, watching the development of the design; now making a broad excavation, now changing the disk every ten seconds, and giving touches so slight and rapid that the unpractised eye can scarcely follow them; and in this way he produces effects of foreshortening, of roundness, and light and shade, which to an eye-witness appear little less than wonderful. The work in hand happened to be tazzi, and in less than half an hour I saw deer in various positions roughed out on six of them, and three completely finished.—*White's July Holiday in Saxony, Bohemia, and Silesia.*